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COLOMBIA CLEAN ENERGY PROGRAM

Annual Report:

October 2015 – September 2016

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Annual Report:
October 2015 – September 2016

Prepared for:
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LIST OF ACRONYMS AND ABBREVIATIONS

ANLA	National Environmental Licensing Agency (*Autoridad Nacional de Licencias Ambientales*)
APC	Colombian Presidential Agency for International Cooperation (*Agencia Presidencial de Cooperación Internacional de Colombia*)
AR	Augmented Reality
AWP4	Fourth Annual Work Plan (October 2015 - September 2016)
B&M	Branding and Marking
C&O	Communications and Outreach
CAEM	Environmental Business Corporation (*Corporación Ambiental Empresarial*)
Cancillería	Colombian Ministry of Foreign Affairs (*Ministerio de Asuntos Exteriores*)
CCEP	Colombia Clean Energy Program (USAID Program)
CEIR	Indigenous Rural Educational Center (*Centro Educativo Indígena Rural*)
CERI	Regional Indigenous Educational Center (*Centro Educativo Regional Indígena*)
CO_2	Carbon Di-Oxide
CVC	Valle del Cauca Regional Environmental Authority (*Corporación Autónoma Regional del Valle del Cauca*)
DDP	Departmental Development Plan
DIAN	National Tax and Customs Agency (*Dirección de Impuestos y Aduanas Nacionales*)
DNP	National Planning Department (*Departamento Nacional de Planeación*)
DPS	National Prosperity Department (*Departamento para la Prosperidad Social*)
EE	Energy Efficiency
EPM	*Empresas Públicas de Medellín*
EPSA	*Empresa de Energía del Pacífico*
ESCO	Energy Services Company
FCGI	*Fundación Cerrejón Guajira Indígena*
FDN	National Financial Development Corporation (*Financiera de Desarrollo Nacional)*
FONADE	Financial Fund for Development Projects (*Fondo Financiero de Proyectos de Desarrollo*)
FY2015	Fiscal Year 2015 (corresponding to the period October 2014 - September 2015)
FY2016	Fiscal Year 2016 (corresponding to the period October 2015 - September 2016)
GHG	Greenhouse Gases
GIS	Geographic Information System
GOC	Government of Colombia
IADB	Inter American Development Bank
ICBF	Colombian Family Wellfare Institute (*Instituto Colombiano de Bienestar Familiar*)
ICTs	Information and Communication Technologies
IPS	Health Services Institute (*Instituto Prestador de Salud*)
IPSE	Institute of Planning and Promotion of Energy Solutions in the ZNI (*Instituto de Planificación y Promoción de Soluciones Energéticas para las ZNI*)
JASE	Local Community Board for Energy Services Management (*Junta Administradora de Servicios de Energía*)
JBB	Bogota Botanical Garden (*Jardín Botánico de Bogota Jose Celestino Mutis*)
kW	Kilowatt
M&E	Monitoring and Evaluation
MADS	Ministry of Environment and Sustainable Development (*Ministerio de Ambiente y Desarrollo Sostenible*)

MHP	Micro hydroelectric power generator
MinTIC	Ministry of Information and Communications Technology (*Ministerio de Tecnologías de la Información y las Comunicaciones*)
MME	Ministry of Mines and Energy (*Ministerio de Minas y Energía*)
MONITOR	USAID/Colombia's Information and Monitoring System
MW	Megawatt
NGO	Non-governmental Organization
PERS	Sustainable Rural Energization Plans (*Planes de Energización Rural Sostenible*)
PESENCA	Atlantic Coast Special Energy Program (*Programa Especial de Energía de la Costa Atlántica*)
PEZNI	Energy Plan for Non-Interconected Areas (*Plan de Energización para Zonas no Interconectadas*)
PIEC	Indicative Electricity Coverage Plan (*Plan Indicativo de Expansión de Cobertura*)
PINPESCA	*Asociación de Pescadores y Piangüeras del Río Cajambre*
PMP	Performance Monitoring Plan
PPF	Clean Energy Project Preparation Facility (known in Spanish as *Mecanismo para la Estructuración de Proyectos de Energía Limpia* – Clean Energy Project Structuring Mechanism)
PV systems	Photovoltaic systems
PY3	Third program year (October 2014 - September 2015)
QR	Quick Response Codes
RE	Renewable Energy
RFP	Request for Proposal
SELF	Solar Electric Light Fund (USAID Program)
SGR	Royalties General System (*Sistema General de Regalías*)
SIN	National Interconnected System (*Sistema Interconectado Nacional*)
SME	Small and Medium Enterprises
T1	Task 1- Renewable energy and energy efficiency enabling environment and institutional capacity development
T2	Task 2- Expanding access to renewable energy sources in currently unserved areas
T3	Task 3 - Energy efficiency and renewable energy investment promotion
Tt	Tetra Tech (Prime Contractor)
UDENAR	Nariño University (*Universidad de Nariño*)
UNIDO	United Nations Industrial Development Organization
UPME	Mining and Energy Planning Unit (*Unidad de Planeación Minero Energética*)
USAID	United States Agency for International Development
VAT	Value Added Tax
WFP	World Food Program
ZNI	Non-Interconnected Zones (Zonas no Interconectadas)

1. SUMMARY OF KEY ACTIVITIES AND ACHIEVEMENTS

1.1 INTRODUCTION

The United States Agency of International Development (USAID) Colombia Clean Energy Program (CCEP) carried out a decisive phase during Fiscal Year 2016 (FY2016, corresponding to October 2015 - September 2016). The Program became a key player in the development of Clean Energy (CE) solutions in Colombia and was instrumental in assisting Colombian Government (GOC) energy sector institutions at the national, regional and local level achieve their goals. Much has been achieved since the start of the program in January 2012 and results achieved in 2016 surpass previous years, by far.

Despite constant and repeated delays in implementation, CCEP has stayed on track and is running according to its overarching implementation vision as shown in Figure 1. Between October 2015 and September 2016, the Program indeed reached most targets, in spite of conditions that affected implementation and individual project performance.

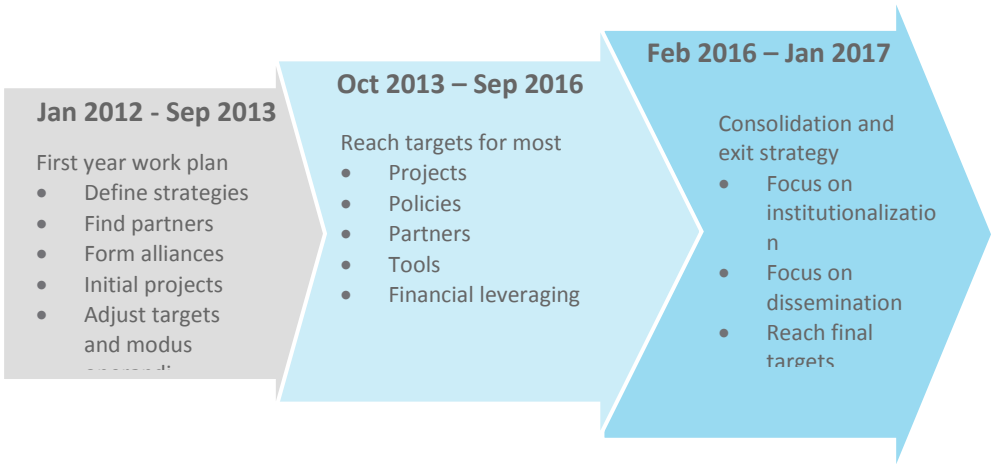

Figure 1 CCEP's strategic implementation vision

As stressed in previous and current work plans, CCEP has worked not only on culminating whatever incentive fund projects involving renewable energy (RE) and energy efficiency (EE) installations were still under way, but also on an orderly "Consolidation and Exit Strategy," by focusing on institutionalization and dissemination of CCEP initiatives and results. Section 1.3 presents CCEP's institutionalization and dissemination strategies for major work fronts.

The energy sector went through critical events this year, which forced GOC to focus in urgent matters, leaving aside important issues. An intense drought caused by *El Niño*, damages to the largest hydro power plant in the country and a large thermal power plant in Atlántico and the inability of thermal plants to supply enough energy to respond to the country's demand, led Colombia to the brink of power blackouts, an institutional void and lack of leadership in the energy sector, which impacted performance in Task 1 (T1). Progress in Task 2 (T2) projects was arduous due to difficulties in Arusí and Sabana de Crespo, which ultimately led to project cancellations and rapid deployment of complementary projects in our pipeline to surpass the ensuing voids in Program targets and indicators. T2 projects also suffered numerous

challenges caused by delays in import procedures of photovoltaic systems (PV systems), equipment and components; a 45-day trucker strike that practically froze cargo transport throughout the country; and difficult coordination between multiple allies, all interested in a timely and efficient, but burdensome installation, of more than 15 simultaneous PV projects in the country. Most Task 3 (T3) activities ran smoothly, except for the installation of dosifier equipment in small and medium (SME) brick manufacturers in Cundinamarca and Boyacá. Technical and operational challenges forced CCEP to take a greater role in project implementation, provide direct technical assistance and review performance. Consequently, the Program was able to complete most interventions satisfactorily; though not all project targets were met.

This report covers the period from October 2015 to September 2016 and highlights the main actions and results obtained by CCEP during its fourth year of operation. In this time, the Program indeed reached most targets and accomplished results in terms of policies, partnerships, tools and financial leveraging. In addition, it started to work in its consolidation and exit strategy, focusing on institutionalization with key institutions and disseminating results. Figure 2 presents an overview of CCEP projects, by task, showing that indeed the Program has implemented specific interventions throughout most of Colombia, many of which will carry over to 2017 and further by counterparts and allies. During FY2016, CCEP carried out RE/EE projects in 69 communities, 44 industrial installations and 5 demonstration sites in 25 departments, as well as planning, policy and educational projects in 75 regions or municipalities. Of these, 92 RE/EE field projects were completed and 21 are underway and scheduled for completion during October and November 2016.

Figure 2 Overview of CCEP interventions in Colombia

1.2 MAIN ACCOMPLISHMENTS AND RESULTS

This document presents Program performance in line with the contract's tasks and expected results, as well as work done to reach Program targets, as shown in Table 1.

Table 1 CCEP Expected Results and Program Indicators

Task	Expected Results	GHG	Investment mobilized	Institutions	Laws, policies, strategies, plans, or regulations	Person hours of training	Energy savings	CE capacity installed	CE capacity that achieved financial closure	Beneficiaries	Tools, technologies, and methodologies	Pre-investment	Employment
Task 1 Energy efficiency and renewable energy enabling environment and institutional capacity development	Enhanced capacity of MME, UPME, IPSE, energy companies and pertinent regional institutions to formulate and implement renewable energy policies, programs and projects.		✓	✓	✓	✓					✓		
	Revised policies for utilizing public sector rural electrification funds to attract private sector investment.		✓	✓	✓	✓					✓	✓	
	Enhanced capacity of Government of Colombia entities to develop energy sector specific components of a low emissions development strategy.		✓	✓	✓	✓					✓		
	Financial mechanisms and incentives established to promote public and private investment in EE/RE projects.		✓	✓	✓	✓					✓	✓	
	Renewable energy and energy efficiency technologies and applications demonstrated and diffused to policymakers and general population through CCEP educational, awareness and outreach program.	✓	✓	✓		✓		✓	✓		✓	✓	✓
	2,000 people gaining or improving employment, directly or indirectly, as a result of CE program interventions.		✓	✓		✓							
Task 2 Expanding access to renewable energy sources in unserved areas	Database of rural renewable resources and population centers established and managed by appropriate government, NGO, or academic institution.			✓							✓		
	Sustainable business models developed and implemented for rural renewable energy systems.			✓		✓				✓	✓	✓	✓
	Sustainable community scale rural renewable energy and ZNI municipal seat electrification projects benefiting 16,000 beneficiaries.	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
	Productive use activities developed in rural areas stimulating rural economic development, for example, cold-chain development or value-added product development utilizing CE.		✓			✓				✓	✓	✓	✓
	20 rural energy service providers or community cooperatives trained in technical and business requirements for operating a community scale rural utility.		✓	✓		✓				✓	✓	✓	✓
	Quantitative impact evaluation completed highlighting impact of rural electrification programs.									✓	✓		
Task 3 Energy efficiency and renewable energy investment promotion	Projects will facilitate energy savings, energy cost savings and renewable generation (number determined by recommendation of aforementioned analysis).	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓
	Significant project impacts in terms of energy and cost savings and improved competitiveness of Colombian industries.	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓
	Energy efficiency project transactions facilitated across range of sectors.		✓	✓	✓	✓						✓	

Task 1. Renewable Energy and Energy Efficiency Enabling Environment

During this program year, CCEP provided technical assistance to enhance the capacity of energy sector institutions to strengthen and formalize GOC participation in CE initiatives, mainly through planning, regulatory development and policies; and support potential demonstration projects that promote RE and EE applications, considering the policy, outreach and educational components. Figure 3 presents an overview of CCEP T1 interventions.

Key Achievements

- Seven sustainable rural energization plans (*Planes de Energización Rural Sostenible* - PERS) completed or underway in Tolima, La Guajira, Cundinamarca, Chocó, Cesar, Orinoquia (four departments), and Putumayo, for a total of eight plans supported since Program start (including Nariño, completed in 2014).
- PERS strategies and projects were formally incorporated in Nariño and Guajira departmental development plans (2016-2019).
- Work with the Mining and Energy Planning Unit (*Unidad de Planeación Minero Energética* - UPME) and the Institute of Planning and Promotion of Energy Solutions in the Non-Interconnected Zones (*Instituto de Planificación y Promoción de Soluciones Energéticas para las Zonas No Interconectadas* - IPSE) to transfer and institutionalize PERS methodology as a long-term planning tool that helps governments plan for local and regional rural energy development, taking into consideration energy demand and supply in a 20-year scenario.
- Institutional strategy to promote Law 1715/2014 tax incentive enactments with the Ministry of Mines and Energy (*Ministerio de Minas y Energía* - MME), Presidencia, UPME and the National Tax and Customs Agency (*Dirección de Impuestos y Aduanas Nacionales* - DIAN).

Figure 3 T1 interventions

- Initiated the institutionalization strategy for the Clean Energy Project Preparation Facility (PPF) by identifying key players that can take over CCEP work to promote and facilitate private sector investment in CE.
- Started last two components of the CE demonstration solutions at the Bogotá Botanical Garden (*Jardín Botánico de Bogotá* – JBB).
- Support training components in *Iluminando*, a private-sector project to encourage entrepreneurs in off-grid locations to distribute solar lanterns using innovative commercialization schemes.
- Three demonstration projects underway to incorporate RE/EE components in environmental education curricula in 16 schools in Cundinamarca; a solar-powered sustainable transportation system in Nariño; and CE alternatives for solar air conditioning systems in a university building in Antioquia.

Task 2. Expanding Access to Renewable Energy Sources in Currently Unserved Areas

During FY2016, CCEP completed 53 RE interventions in rural communities throughout the country. The projects, with significant impacts for more than 8,600 beneficiaries as of September 2016, also served as examples of sustainable rural energy interventions that can be replicated throughout the country. CCEP interventions, shown in **¡Error! No se encuentra el origen de la referencia.**, also left positive and negative experiences to learn from when implementing energy projects in remote locations and working with vulnerable populations.

Lastly, the Program received significant press coverage for the solar/mechanical water pumping systems in La Guajira, the hybrid solar/diesel power generation in Valle del Cauca, and the micro hydro power plant (MHP) in Magdalena as described in chapter 5.

Figure 4 T2 interventions

Key achievements:

- 38 water pumping system (solar/mechanically assisted) installed in La Guajira.
- Two MHPs completed in Magdalena and Chocó.
- One hybrid (solar/diesel) energy system completed in Valle del Cauca, in alliance with the *Empresa de Energía del Pacífico SA* (EPSA). This is the first of its kind in Colombia, supported by the private sector.
- 24 PV systems installed in Amazonas, Antioquia, Chocó, La Guajira, Magdalena, Nariño, Valle del Cauca, Vaupes, and Vichada.
- Socio entrepreneurial and environmental training components to strengthen community-based organizations underway in 18 locations.
- 53 RE interventions completed, during FY2016.
- 8,677 people with improved access to energy services, during FY2016.

Figure 5 indicates the significant progress achieved during FY2016 in achieving Program targets of 16,000 off-grid RE beneficiaries. While up through FY2015 (Fiscal Year 2015, corresponding to the period October 2014 - September 2015), CCEP had only been able to finalize RE projects benefitting 2,098 inhabitants, projects closed and reporting Program indicators during FY2016 totaled 8,677 additional inhabitants. Projects still underway for completion and reporting by mid-November, or finalized in September and pending confirmation and uploading of indicators in MONITOR, are expected to yield an additional 7,807, assuring that the Program will improve access to clean energy solutions for at least **18,582 ZNI inhabitants** – despite the cancellation of major projects like Sabana de Crespo (target population above 4,000) or the slow pace of environmental licensing, social consultation, engineering designs, commitment and disbursement of financial resources by project allies, etc.

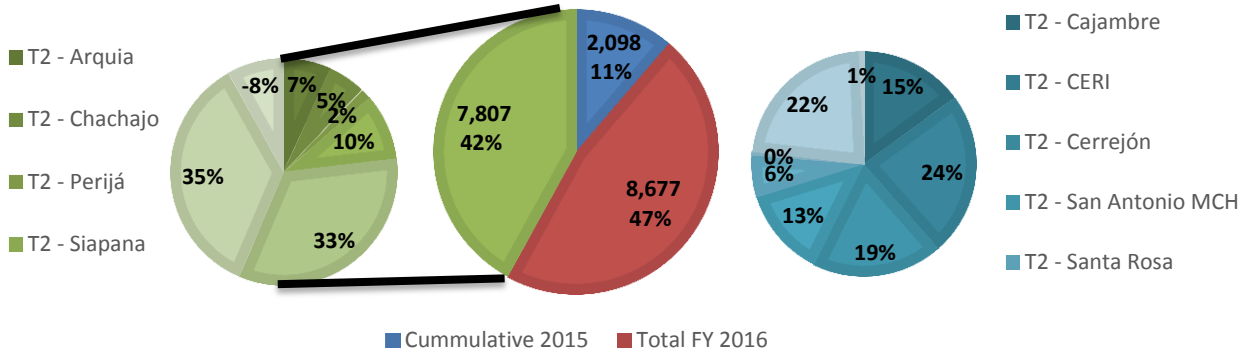

Figure 5 CCEP Beneficiaries

Task 3. Energy Efficiency and Renewable Energy Investment Promotion

In T3, CCEP supported numerous private sector initiatives to design and carry out clean energy investments in brick manufacturing, textiles, agroindustry, food and beverages, paper and pulp, and sugar cane production and processing, with significant annual reductions in greenhouse gas (GHG) emissions and energy savings, as shown in Figure 6 and Figure 7. Figure 8 presents a map of T3 interventions.

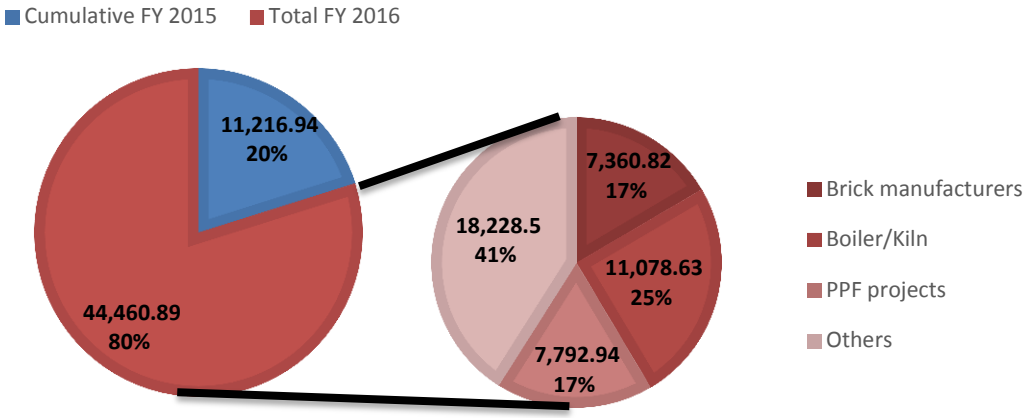

Figure 6 GHG emissions, program

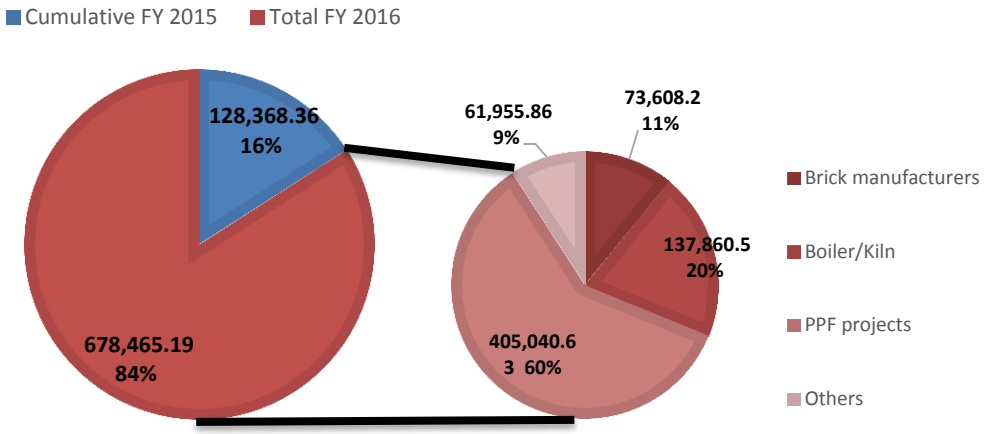

Figure 7 GHG emissions, lifetime

Key Achievements

- 18 brick manufacturers in Cundinamarca and Boyacá completed combustion optimization projects, reducing 7,360 tons of carbon dioxide (CO_2) emissions per year.
- Cleaner energy solutions installed in 12 brick, metallurgical and textile factories in Antioquia, Atlántico, Caldas, Cauca, Cordoba, Huila, and Valle del Cauca reducing 11,079 tons of CO_2 emissions per year.
- 16 PPF engineering and financial structuring projects completed or underway totaling a potential investment of more than USD 130 million and a reduction of over 120,000 tons of CO_2 emissions per year.
- One PPF engineering project reduced 7,793 metric tons of CO_2e during FY2016.
- One Energy Services Company (ESCO) biogas-to-steam project designed with slight CCEP co-finance in FY2014 implemented during FY2016 at a major dairy processing plant, with an investment of USD 351,000 and potential CO_2e reductions of 850 metric tons per year. CCEP contributed less than 3% of total investment costs (study + installations).

Figure 8 T3 Interventions

1.3 CONSOLIDATION AND EXIT STRATEGY

During its lifespan, CCEP has worked on numerous initiatives with over 100 allies and counterparts in all three tasks. Though many of these allies – such as beneficiary communities or individual enterprises – were only involved in individual interventions, entities such as UPME have been a strong ally in major policy and planning endeavours. New agents, such as the High Commission on Post Conflict recently mobilized or the National Financial Development Corporation (*Financiera de Desarrollo Nacional* - FDN), have arisen recently as potential successors for CCEP T2-type interventions in sustainable rural energy project development and CE investment project structuring undertaken through the PPF, respectively.

This section presents an overview of CCEP's institutionalization and dissemination strategies for major work fronts.

With growing intensity during the past three quarters, this work has been undertaken through:

a) Intensified technical, socioeconomic and environmental monitoring and evauation (M&E) field work to ascertain proper functioning and assure T2 community or T3 business appropriation, management and sustainability of RE/EE systems installed. To the extent that CCEP can assure that communities and businesses involved sustainably manage and benefit from RE/EE initiatives beyond our contract period, valuable examples of the approach and accomplishments of clean energy projects will "tell the story" and serve to stimulate similar initiatives over time.

b) For each task, we have focused on one or two broad but key initiatives with proven track record and potential for further development beyond CCEP lifetime, and sought to work with strong allies who can push them forward. In the case of **T1**, focus has been two-pronged:
   i. Institutionalizing the **PERS process** at the national and regional levels, with all its methodological, policy and project structuring aspects;
   ii. Regulatory and methodological development and public roll-out of technological standards, tax incentives, institutional procedures and public investment criteria outlined in **RE/EE Law 1715/2014** to set the stage for greater public and private sector investment in clean energy projects both in off-grid communities and throughout the economy.

   In the case of **T2**, CCEP has been showcasing specific projects with potential replicability – such as the Guajira water pumping project with *Fundación Cerrejón Guajira Indígena* (FCGI) or the Punta Soldado hybrid solar/diesel solution with EPSA for the Pacific Coast – and also working intensely with the agricultural development and rural energization "Rapid Response" teams of the High Commission on **Post Conflict**, who are interested in adopting the "CCEP model" for development of sustainable rural community energy for both household and productive purposes. The fiscal year ended with the joint identification of at least seven sustainable community RE projects for potential implementation through the Post Conflict team with *Plan Pazcífico* funding, already assured through an Inter American Development Bank (IADB) loan. Post Conflict will require in-house technical assistance from CCEP during October and November in technological and social structuring of the community projects approved for funding by *Plan Pazcífico*, and the identification of other potential rural energization projects in the 20 departments and 50-odd municipalities where the Rapid Response team will focus attention for the next 24 months.

   Regarding **T3**, CCEP's major concern has been defining and establishing a proper institutional arrangement to carry on its successful Clean Energy Project Structuring Mechanism (known as PPF for its 2013 conception of a Project Preparation Facility). At the time of writing, the FDN has reviewed the full PPF pipeline as well as operational manuals, team profiles and budget requirements, and other specific documentation on PPF management, and has expressed interest in continuing the effort within its project structuring program. Another interested party is the United Nations Industrial Development Organization (UNIDO), which is currently embarked on a separate energy efficiency (EE) program with UPME and is considering partial incorporation of PPF procedures and operations within that program. UPME has manifested willingness to continue with the PPF effort in alliance with either or both of these organizations.

c) Dissemination. During FY2016, CCEP has revamped and intensified its communications and outreach (C&O) plan to ensure that Program audiences understand the results and impact of clean energy actions undertaken by USAID and its allies during the course of our contract, as well as the enormous opportunities for inserting RE and EE in public policy, off-grid communities and

businesses. As CCEP projects surpassed planning and implementation phases to actual completion throughout the year, the Program produced videos, organized workshops and field trips to present results and motivate national and regional GOC actors, international cooperation and multilateral organizations, non-governmental organizations (NGOs) and businesses to replicate or follow up on particular projects. To enhance this work, CCEP has produced or co-sponsored high-impact events; communications pieces and press coverage; redesigned and promoted its website to broader audiences; and designed a number of events to take place during next quarter to promote RE law tax incentives, sustainable rural energy projects, EE investments by private sector and close up CCEP-promoted projects and initiatives.

Throughout the coming sections, we present Program activities and achievements during FY2016 with a view at the consolidation and institutionalization of clean energy actions in the country beyond CCEP's implementation.

1.4 SUMMARY OF THIRD PARTY FUNDS MOBILIZED THROUGH FOURTH YEAR OF CCEPIMPLEMENTATION

By September 2016, projects worth about USD 24.1 million were completed or in the last stages of implementation, as presented in Table 2. The USD 24.1 million includes over USD 18.8 million in funds mobilized/leveraged, of which USD 10.8 million have been verified and properly supported by partners certifications and also reported / uploaded in MONITOR). The remaining amount is being reviewed. The Program will report / upload in MONITOR the final amount during the last quarter of Program operations and presented in CCEP's Final Report.

This USD 24 million compares with the September 2015 report, where USD 13.5 million had been committed through CCEP's Incentive Fund and counterpart funding. This year, CCEP doubled and consolidated the financial commitments to specific interventions, in spite of numerous projects that were cancelled or suspended, such as several T2 interventions with Valle del Cauca Regional Environmental Authority (*Corporación Autónoma Regional del Valle del Cauca* - CVC) or Program investments in Arusí (page 46) and Sabana de Crespo (page 39). Largely due to private sector investment decisions in T3 projects, co-funding commitments by CCEP allies (GOC, private counterparts and beneficiaries) represent an aggregate 85% of project budgets mobilized during FY2016 and 78% since Program start. CCEP leveraging by task shows significant results, as presented in the following tables – for every USD 1 in direct investment through the Program, USAID has mobilized USD 4.55 to date. To simplify, the tables also aggregate CCEP Incentive Fund and direct Tetra Tech (Tt) consultancies and subcontracts per project.

Projects, by CCEP Task		Approved Budgets	BUDGETS MOBILIZED FY2016			CUMULATIVE BUDGETS MOBILIZED THROUGH FY2016		
		As of FY2016	Mobilized GOC/Private/Beneficiaries	CCEP Incentive Fund plus Technical Assistance	Total	Mobilized GOC/Private/Beneficiaries	CCEP Incentive Fund plus Technical Assistance	Total
Task 1	Renewable Energy and Energy Efficiency Enabling Environment and Institutional Capacity Development	USD	$231,952	$690,264	$922,216	$1,784,877	$1,096,081	$2,880,958
		Percent	**25%**	**75%**	**100%**	**62%**	**38%**	**100%**
Task 2	Expanding Access to Renewable Energy Sources in Currently Unserved Areas	USD	$1,091,291	$850,427	$1,941,718	$3,134,327	$2,558,145	$5,692,472
		Percent	**56%**	**44%**	**100%**	**55%**	**45%**	**100%**
Task 3	Energy Efficiency and Renewable Energy Investment Promotion	USD	$9,585,043	$419,521	$10,004,564	$13,976,308	$1,669,558	$15,645,866
		Percent	**96%**	**4%**	**100%**	**89%**	**11%**	**100%**
Portfolio Status FY2016	Total budgets and co-finance mobilized	**USD**	**$10,908,286**	**$1,960,212**	**$12,868,498**	**$18,895,512**	**$5,323,784**	**$24,219,295**
		Percent	**85%**	**15%**	**100%**	**78%**	**22%**	**100%**

Table 2 Status of CCEP Leveraging, as of September 2016

CCEP TASK	Short name	Mobilized GOC/Private/ Beneficiaries	CCEP Incentive Fund plus Technical Assistance	Total Cost FY 2016	Mobilized GOC/Private/ Beneficiaries	CCEP Incentive Fund plus Technical Assistance	Total Cost
Task 1	PERS Nariño		34.524,00	34.468,00	528.750,00	80.460,22	609.210,22
	National PERS	49.539,00	174.836,00	224.375,00	49.539,00	174.836,00	224.375,00
	Solar lantern demonstration proje	37.171,00	91.748,00	128.919,00	37.171,00	91.748,00	128.919,00
	UPB Climate Control Project	38.276,00	37.974,00	76.250,00	38.276,00	37.974,00	76.250,00
	Legal and Regulatory Framework	-	105.031,00	105.031,00	-	105.031,00	105.031,00
	UDENAR CE Transportation Projec	106.966,00	113.878,00	220.844,00	106.966,00	113.878,00	220.844,00
	Dinamos	-	132.273,00	132.273,00	-	132.273,00	132.273,00
	FY 2016	231.952	690.264	922.160	760.702	736.200	1.496.902
	THROUGH FY 2015				1.024.175	359.881	1.384.056
	CUMULATIVE TASK 1				1.784.877	1.096.081	2.880.958

Table 3 Status of CCEP Leveraging in T1 Projects, as of September 2016

CCEP TASK	Short name	Mobilized GOC/Private/ Beneficiaries	CCEP Incentive Fund plus Technical Assistance	Total Cost FY 2016	Mobilized GOC/Private/ Beneficiaries	CCEP Incentive Fund plus Technical Assistance	Total Cost
Task 2	Palmor	0	33.564	33.564	819.172	562.172	1.381.344
	Chachajó	0	80.414	358	0	161.330	161.330
	Solar / mechanical pumping systems	42.357	2.853	45.210	216.848	183.838	400.686
	Yucal		3.889		214.314	292.167	506.481
	Telemedicina	95.551		92.339	234.175	179.463	413.638
	Vigía del Fuerte and Bojayá	397.580	223.264	620.844	397.580	223.264	620.844
	Arquía	322.465	57.784	380.249	322.465	57.784	380.249
	Siapana	85.438	56.399	141.837	85.438	56.399	141.837
	Perijá	108.542	79.408	187.950	108.542	79.408	187.950
	CEIR	37.719	171.546	209.265	37.719	171.546	209.265
	JASE / OPEPA Strengthening Traini	1.639	57.610	59.249	1.639	57.610	59.249
	Cajambre/Pimpesca	0	83.696	83.696	0	83.696	83.696
	FY 2016	**1.091.291**	**850.427**	**1.854.561**	**2.437.892**	**2.108.677**	**4.546.569**
	FY 2015				696.435	449.468	1.145.903
	CUMULATIVE TASK 2				**3.134.327**	**2.558.145**	**5.692.472**

Table 4 Status of CCEP Leveraging in T2 Projects, as of September 2016

CCEP TASK	Short name	Mobilized GOC/Private/ Beneficiaries	CCEP Incentive Fund plus Technical Assistance	Total Cost FY 2016	Mobilized GOC/Private/ Beneficiaries	CCEP Incentive Fund plus Technical Assistance	Total Cost
Task 3	Colanta	351.665	0	351.665	362.776	11.111	373.887
	PPF	7.095.867	307.851	7.403.718	7.794.807	589.589	8.384.396
	Hornos y Calderas	977.190	102.475	1.079.665	1.187.204	312.489	1.499.693
	Pueblo Viejo	859.443	0	847.568	1.473.332	11.875	1.485.207
	Delta	300.877	9.195	310.072	300.877	9.195	310.072
	FY 2016	**9.585.042**	**419.521**	**9.992.687**	**11.118.996**	**934.259**	**12.053.255**
	THROUGH FY 2015				2.857.312	735.299	3.592.611
	CUMULATIVE TASK 3				**13.976.308**	**1.669.558**	**15.645.866**

Table 5 Status of CCEP Leveraging in T3 Projects, as of September 2016

1.5 SUMMARY OF PROGRAM EXPENDITURES

USAID has obligated USD 17,193,979 to the contract and Tt has invoiced USD 14,758,158 through the period ending September 30, 2016, approximately 86% of the obligated funding. Figure 9 presents an itemized summary of cumulative program costs invoiced between January 2012 and September 2016.

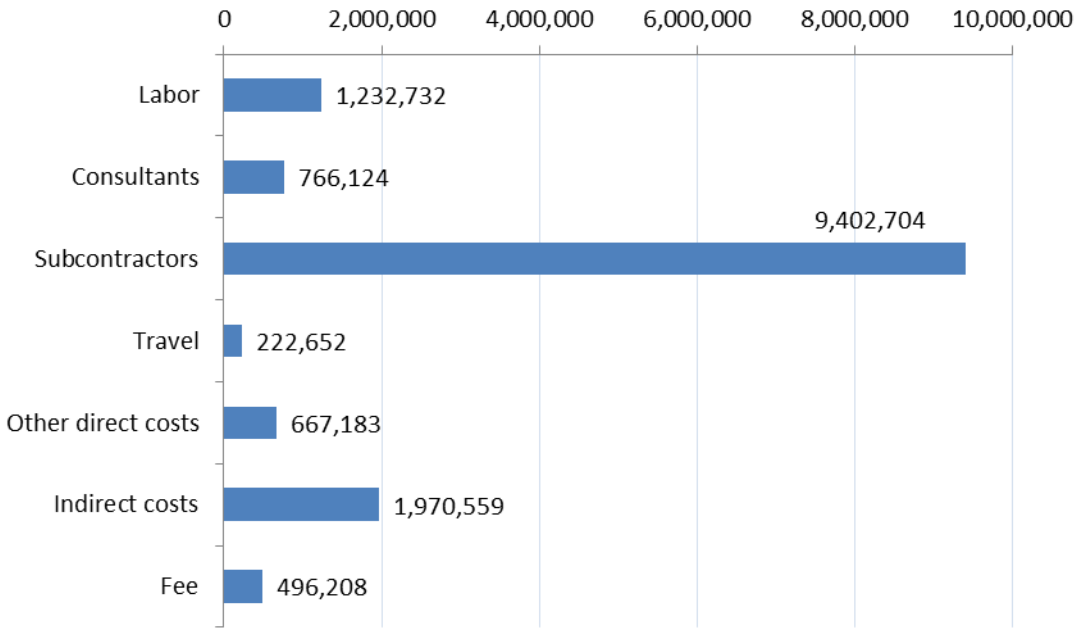

Figure 9 Cumulative program costs invoiced January 2012 – September 2016

CCEP's commitment to complete projects and achieve results paid off, as the program reached a historical level of activity reflected in the latest monthly invoice of about USD 1 million in August 2016. As shown in Figure 10, average monthly program expenditures have increased steadily every year reflecting CCEP implementation pace and demonstrating program's commitment to achieve expected results and excel performance. Overall program expenditures as of September 2016 reached about 80% of the contract ceiling amount.

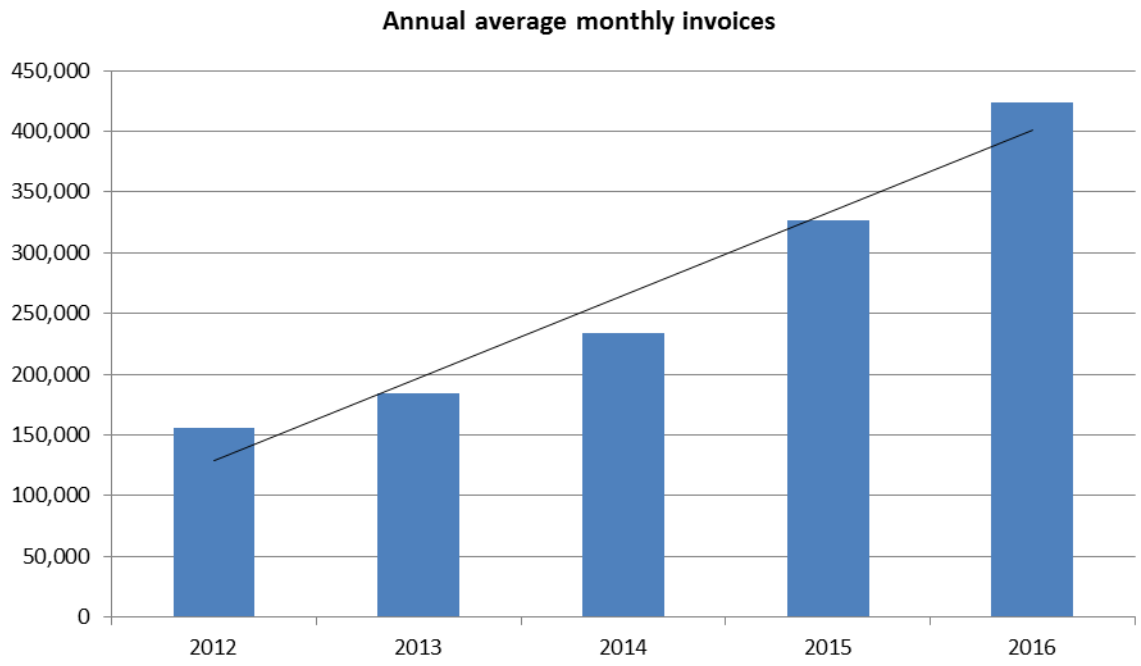

Figure 10 Annual average monthly invoice, as of September 2016

This year spending rates were also affected by a volatile exchange rate and the currency continued to be a critical factor in falling short of ideal burn rate. The COP to USD rate has varied significantly, reaching a lowest of COP 2,819 on November 5, 2015 and a highest of COP 3,434 on February 12, 2016. In March 2016, the USAID Mission requested contractors to use a standard rate of COP 3,000 for budget projections and accruals. This figure has fallen short, since the rate continues to vary: between March 2016 and September 2016 the exchange rate fluctuated between COP 2,833 to COP 3,319 in this seven-month period.

2. TASK 1: RENEWABLE ENERGY AND ENERGY EFFICIENCY ENABLING ENVIRONMENT AND INSTITUTIONAL CAPACITY DEVELOPMENT

2.1 HIGHLIGHTS

Through CCEP, USAID enhanced energy sector institutional capacities in T1 Work Stream 1.1: RE and EE Strategic Planning and Policy and Work Stream 1.2: Demonstration Projects to Promote RE and EE, as presented in CCEP's Fourth Annual Work Plan (AWP4). The first work stream focuses on consolidating and institutionalizing CE initiatives, mainly through planning, regulatory development and policies; and the second one supports potential demonstration projects that promote RE and EE applications, considering the policy, outreach and educational scope of such projects.

Key Achievements this year

- Seven PERS were completed or underway in Tolima, La Guajira, Cundinamarca, Chocó, Cesar, Orinoquia, and Putumayo, for a total of eight plans supported since Program start.
- PERS elements incorporated in Nariño and Guajira departmental development plans.
- Worked with UPME and IPSE to transfer and institutionalize PERS methodology as a long-term planning tool that helps governments plan for local and regional development, taking into consideration energy demand and supply in a 20-year scenario.
- Developed an institutional strategy to promote Law 1715/2014 tax incentive enactments with MME, the Ministry of Environment and Sustainable Development (MInisteiro de Ambiente y Desarrollo Sostenible - MADS/ National Environmental Licensing Agency *(Autoridad Nacional de Licencias Ambientales* - ANLA), UPME and DIAN.
- Initiated PPF institutionalization strategy by identifying key players that can take over CCEP work to promote and facilitate private sector investment in CE.
- Started last two components of the CE demonstration solutions at JBB: a solar-powered biomass drying module to improve fuel used by the garden gasifiers and a custom-made APP to educate visitors about CE solutions installed and natural resources' potential to produce RE.
- Supported training components in *Iluminando*, a private-sector project to encourage rural entrepreneurs in off-grid locations to distribute solar lanterns using innovative commercialization schemes.
- Three demonstration projects initiated and underway to showcase the potential of CE: one incorporates RE/EE components in environmental education curricula in eight municipalities in Cundinamarca; a second, exhibits how CE promotes sustainable transportation (solar-powered electric bicycles) in a university campus in Pasto, Nariño; and the last one demonstrates solar alternatives for air conditioning systems at a university building in Medellín, Antioquia.
- USD 922,160 invested in T1 projects during FY2016, of which USD 231,952 were funds mobilized from project allies.

2.2 ACTIVITY SUMMARY BY WORK STREAM

2.2.1 Work Stream 1.1: RE and EE Strategic Planning and Policy

PERS is the heart of CCEP work on RE and EE strategic planning and policy, since it is a replicable set of methodologies that combine planning, policy-making, project evaluation, and development strategies to utilize RE for rural development in s development in sub-national areas (departments; subregions within them). The plan also includes technological tools to manage geographic-based information and statistics on rural and ZNI areas, which assist in long-term development planning. The rural energy planning methodology in PERS includes project evaluation and development approaches and technological tools for information management and policy making, all attractive elements that encourage plan deployment and suppress the desire to exercise political will and favors amongst local and regional authorities.

During FY2016, CCEP worked with UPME, IPSE, and numerous allies to formulate PERS in the country: three were completed this year (Chocó, La Guajira, and Tolima) and another four are underway (Cesar, Cundinamarca, Putumayo, and Orinoquia – encompassing Arauca, Casanare, Meta, Vichada).

Figure 11 PERS locations

In addition to financing PERS Cesar operations and providing technical assistance and training to UPME, IPSE, and regional partners on PERS implementation, the Program financed a web-based Geographic Information System (GIS) to compile data and statistics from all over the country. The tool, which will be turned over to UPME, will enable users to compare energy supply and demand across regions, determine availability of RE sources and potential.

The Program had the opportunity to work with regional allies to present PERS results to wide audiences during the closing ceremonies that took place in Riohacha, La Guajira (August 30, 2016) and Quibdó, Chocó (September 12, 2016). Closing events were followed by field visits to Pesuapa (Maicao, La Guajira) and the *Universidad Tecnológica del Chocó*'s RE center in Andagoya (Chocó) to present practical solutions to carry out PERS projects in rural areas.

Image 1 PERS information booklet produced by CCEP for working session with mayors and local leaders

PERS Cesar: Planting Energy for Rural Development

Cesar, the last PERS to start, has the most proactive allies, by far. Upon taking office, the Governor of Cesar approached UPME and requested support to initiate PERS work in the department. The governor and his team saw PERS as a roadmap to develop the "Alternative Energy Plan" called for in the CESAR Departmental Development Plan 2016-2019. UPME was extremely interested in supporting the Governorship, but was unable to fund operations of a local team during 2016. CCEP offered financial support to hire seasoned staff with PERS experience and technical assistance and training through its PERS Coordinator, on the condition that both the Unit and the Governorship allocate funding to continue the work in 2017.

Once all parties agreed, and the respective UPME-Governorship MOU was signed, CCEP designed the geographic information system and survey methodologies to be used in field work and the routes for the survey sample, a process underway. The Program also worked with the Governorship to present PERS work and methodology to mayors and regional institutions using, among others, specifically designed workshops and outreach material.

Field work is scheduled to start in October; data will be processed and analyzed in October and November, and results will be presented in December. Starting 2017, UPME will continue working with the regional government and additional allies to implement the second phase of the project and make PERS a reality in the department.

CCEP's strong focus on PERS at the regional level and the national policy level was complemented through the formulation of a National Energy Plan for Non-Interconnected Areas (*Plan de Energización para Zonas no Interconectadas* - PEZNI) in consultation with UPME, IPSE and MME. Rather than seek the promulgation of PEZNI as a separate instrument, CCEP and these GOC agencies decided to work to incorporate rural energization elements from PEZNI and PERS into the legally-binding Indicative Electricity Coverage Plan (*Plan Indicativo de Expansión de Cobertura* - PIEC), which must be updated at least every five years. CCEP T1 staff and consultants proposed concrete inputs and texts to the PIEC under construction with UPME, focused on analyzing energy use in rural areas; cost-benefit of connecting rural users to the national grid over time; required investments; international experiences; suggestions for rural energy service provision business models; and public policy recommendations. CCEP plans to support UPME in discussions with MME to incorporate PEZNI/PERS elements, such as the above, into PIEC, which is scheduled for publication by end of 2016 for application during 2017-2021.

Achievements focused on PERS:

- Nariño and La Guajira incorporated PERS elements, including project proposals, into their Departmental Development Plans (DDP), making it possible to channel financial resources from Departmental investment budgets to co-finance regional PERS initiatives.
- Technical assistance and support provided to UPME and IPSE to formulate and consolidate PERS as medium and long-term planning tool to promote sustainable rural development.
- Provided technical assistance to design a unified web-based PERS Information System that compiles geographic-based information and statistics obtained during surveys.
- Supported UPME in launching a PERS strategy guidebook and annexes and other methodological tools for stakeholders, including departments, municipalities and energy service providers.
- Worked with the Office of the High Commissioner on Post Conflict and, with UPME/MME, presented the PERS/PEZNI approach as the basis for the design of the National Rural Electrification Plan called for in the Peace Accord and the "CCEP model" of sustainable rural energization projects with productive components as an alternative to promote deployment of CE technologies for rural development in post conflict areas.
- PERS elements incorporated into PEZNI.
- PEZNI strategic and policy recommendations identified and proposed for PIEC incorporation.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Institutions	11	4	8	-	12
Investment mobilized	1,212,517	1,162,978	49,539	-	1,212,517
Laws, policies, strategies, plans or regulations	9	1	6	4	11
Person-hours of training	4,870	2,859	980	1,449	5,288
Pre-investment activities	8	4	4	1	9
Tools, technologies and methodologies	16	4	12	-	16

Table 6 PERS indicators

A second thrust of CCEP's RE and EE strategic planning and policy focuses on legal and regulatory work regarding Law 1715/2014, which aims to stimulate and regulate integration of non-conventional RE into the National Interconnected Energy System (*Sistema Interconectado Nacional* - SIN)and assigns GOC roles and responsibilities regarding RE and EE promotion. CCEP support to prepare enactments to implement this bill and other legislation and policies on RE and EE was vital to GOC agencies involved during FY2016 and a key element in the Program's institutionalization efforts.

The CE tax incentives in Law 1715/2014, presented in Decree 2143 (November 2015), allows investors to deduce up to 50% of investments in CE projects in income tax reports during five years; declare a 0% Value Added Tax (VAT) for investments in equipment, elements, machinery, and services to produce, use and measure RE; benefit from tariff exemptions; and permits an accelerated asset depreciation. In spite of the benefits, the tax incentives, however, had a slow start. Although the MME issued the decree in November 2015 and UPME produced a resolution in early 2016, it took until August 2016 for the MADS to issue the resolution containing requirements to obtain the environmental certifications. With a complete regulatory framework finally ready, CCEP worked with project allies to quickly revive actions envisioned initially for the third quarter of 2016 (April to June 2016) to design a guidebook presenting the 1715 tax incentive procedures and a series of rollout workshops which will take place in October 2016.

GOC institutions expect great impacts from these broader CE tax incentives, based on the results of 2012 tax incentives (Resolution 563/2012 issued by UPME). Between January 2013 and February 2016, UPME has received 74 applications to apply the 563 Resolution incentives to private sector investment projects worth a total of over USD 620 million. Approved VAT exemptions and income tax deductions represent USD 113 million, as shown in the following table.

Sector	Number of Applications	Investment (million USD)	VAT (million USD)	Income tax (million USD)	Total (million USD)
Industry	26	235.3	3.9	0.1	4.0
Transportation	27	355.7	56.5	51.3	107.8
Non-conventional Energy Sources	21	38.9	1.5	-	1.5
TOTAL	**74**	**629.9**	**61.9**	**51.4**	**113.3**

Table 7 UPME Tax Incentives (Resolution 563/2012) status, as of February 2016

During FY2016, the MME, UPME and the National Planning Department (*Departamento Nacional de Planeación* - DNP) also requested CCEP'S technical assistance in designing the methodological guidelines to formulate "Typical Projects" for the installation of individual household solar photovoltaic (PV) systems in the ZNI, for territorial authorities wishing to apply to royalties funds (*Sistema General de Regalías – SGR)* to finance these investments. The methodology, published by DNP in August 2016, presents step-by-step all the aspects necessary to design and mount these projects, such as:

- Identification and dimensioning of the magnitude of the problem
- Estimation of energy demand in rural homes
- Technical details and costs associated with individual solar systems (indicative sizing and costing model for specific regions, solar radiation conditions, altitude, etc.)
- Estimated time table for implementation of solutions
- Identification of resources required for operation and maintenance
- Applicable regulations

This information serves as a key tool for off-grid solar projects considered in the national expansion strategy that will benefit around 60 thousand households with individual solar energy solutions. The national expansion strategy goal is 173 thousand households by the end of 2018.

Achievements focused on legal and regulatory work:

- Supported the development of technical standards for household PV systems and presented results to MME, UPME, IPSE and DNP. The proposal defined elements required to install photovoltaic (PV) systems in ZNI; recommendations to take into account in the design, installation, and maintenance of PV systems; an overview of energy needs in rural housing; and an indicative sizing and costing model for specific regions. This information was essential input to the publication by DNP of the official guidelines for formulation of individual PV system projects in the ZNI requesting royalties funding from the SGR.
- Supported the development of technical standards for small-scale distributed generation systems. One particular outcome was used by the MME to structure the regulatory decree on small-scale self-generation and distributed generation, which sets policy guidelines for these activities. In addition, the Program is providing technical assistance to implement these technical standards for small-scale distributed generation in a PV system provider in Dosquebradas, Risaralda. Results to date show 50% reduction in energy consumption from the city grid. In the near future, the PV system will be connected to the national grid that, using a bidirectional meter, will provide energy to Pereira's energy service provider.
- Case studies on fiscal and economic impacts of Law 1715/2014 tax incentives in concrete RE and EE interventions supported by CCEP presented to MME. This led to the incorporation of several recommendations (such as concurrency of accelerated depreciation and income tax reductions) in the final tax incentive Decree 2143 of November 2015.
- Institutional strategy to promote Law 1715/2014 tax incentive enactments with MME, *Presidencia*, UPME and DIAN.
- Two regulatory decrees as enactments of Law 1715/2014 issued by MME: decree 2143/2015 regarding tax incentives for investments in RE and EE and 1623/2015 for coverage expansion. CCEP also provided prime material for the ministry to issue decree 2469/2014 regarding large-scale auto-generation and a draft decree for small-scale distributed generation, currently under review.

The final CCEP contribution in RE and EE strategic planning and policy is the PPF, an independent mechanism that facilitates private sector investment in EE and RE. Early on in the Program, CCEP identified that a major barrier to the successful implementation of CE projects in Colombia is not lack of funding or suitable opportunities, but the availability of well-prepared projects. The Program designed a methodology and held workshops with industry, banks and donor entities to validate the idea and PPF was launched 2014. The mechanism was designed to overcome an enormous gap that exists between insufficiently designed technical proposals for private sector CE projects and abundantly available investment financing, by co-funding detailed engineering studies and assisting with financial engineering exercises required to determine whether or not planned investments are technically viable and financially profitable, thereby reaching “financial closure” and board of directors’ approvals within companies and financial institutions.

Though other agencies were invited to take part, UPME was the only one that became a partner to the initiative in September 2014, assigning initial funding for PPF project development. By the end of FY2015, nine medium to large scale industrial and commercial EE projects were structured through the PPF mechanism, of which a major paper and pulp industry project to reduce coal consumption by 20 tons per day, increase use of residual biomass from 250 to 350 tons per day and reduce emissions by over 20,000 tCO_2/yr was implemented during FY2016.

In FY2016, CCEP cofinanced a second tier of six engineering and financial structuring studies and UPME approved financing another two through its 2016 investment budget ending in December. In addition, the Program focused PPF institutionalization efforts in consolidating the methodology and finding a suitable successor to take over the mechanism in a post-CCEP era. The logic behind institutionalization is clear: if PPF continues it will help identify prospective projects and generate a pipeline and support financial closure of significant private sector RE and EE projects in the economy, thus promoting CE investments, economic development and CO_2 emissions reductions.

CCEP identified potential heirs and evaluated their potential based on (1) capacity to continue supporting project structuring and operations; (2) aptitude to engage the private sector, particularly industrial fossil fuel consumers, the transportation sector, and ESCOs; (3) ability to work with and receive financing from donors and international financial institutions; (4) maintain and cultivate collaboration with UPME as the GOC counterpart; (5) commitment to sustain an operating a technical unit responsible for project structuring and monitoring; and (6) approval of USAID as an appropriate successor. At the time of writing, CCEP has identified and evaluated five potential alternatives and is discussing institutionalization and transfer options with the top two evaluated: the FDN and UNIDO. Final handover is expected to take place by end of November 2016.

Achievements focused on PPF:

- Technical assistance to MME and UPME to institutionalize PPF methodologies and achievements through various mechanisms, including transfer of operation to FDN and/or UNIDO.
- Since PPF start in 2015, CCEP and UPME have supported 12 companies to structure 15 RE/EE projects, from a total of over 75 initiatives submitted by companies for PPF confinance. As shown in Table 8, the results of this effort are impressive. Four projects have either been implemented or are scheduled for implementation, totaling investments over USD 40 million and reductions of more than 550,000 tons of CO_2e during project lifetime. Four more worth another USD 20 million, recently completed or still underway, show solid results and the companies involved indicate willingness to invest in them. Five projects have resulted in low return on investment and companies have discarded implementation, and the rest are on standby depending on exchange rates, tax incentives or other criteria to be clarified. Overall, the 16 PPF projects present a potential investment of USD 134 million and, if implemented, would reduce more than 2 million tons of CO_2e during project lifetime. Detailed information on PPF is presented in Work stream 3.3: Consolidate opportunities for private sector investment in clean energy through CCEP's PPF.

Table 8 Status of PPF projects, as of September 2016

Implementation status	Number of projects	Sum of CCEP Investment (in USD)	Sum of Funds mobilized (in USD)	Sum of Estimated emissions reduced per year (tons of CO2e)	Sum of Estimated emissions reduced during project lifetime (tons of CO2e)
1 - Implemented	2	54,011	2,870,000	20,000	416,920
2 - Approved implementation post-CCEP	2	103,500	37,500,000	3,200	64,000
3 - Probable implementation post-CCEP	1	22,006	4,395,667	3,500	70,000
4 - Engineering studies completed; decision pending	4	49,700	45,285,321	14,732	550,000
5 - Engineering studies underway	3	90,369	39,642,470	72,890	982,000
6 - Discarded due to low return on investments	4		5,037,671	6,340	
Total general	**16**	**319,585**	**134,731,128**	**120,662**	**2,082,920**

2.2.2 Work Stream 1.2: Demonstration Projects to Promote RE and EE

In FY2016, CCEP designed and implemented high-impact demonstration projects to showcase RE and EE technologies, raise awareness among the general public and policymakers and promote CE solutions to present-day challenges. By identifying, implementing, monitoring, and evaluating demonstration projects that encourage RE initiatives and EE practices, CCEP will prepare recommendations to GOC institutions and interested parties on whether or not to replicate these experiences.

In FY2016, CCEP supported various RE and/or EE demonstration projects in five locations.

i. JBB CE interventions and *BogotanicAPP*

The Program started the last two components of the CE project at the JBB, with the construction and installation of a solar-powered biomass drying system and a custom-made APP to educate visitors about CE solutions installed in the garden and potential energy sources.

The solar-powered biomass drying system will help resolve an issue associated with the content of humidity of the biomass caused by Bogota's altitude and climate. CCEP's funded gasifiers installed in 2014 use as fuel tree trims obtained throughout the city. Once that the biomass drying system is installed, JBB gardeners will place tree trims on the solar-powered drying module to reduce humidity to optimal levels improving fuel quality, producing better material, and improving overall gasifier performance.

BogotanicAPP is a CCEP-funded APP for JBB, containing educational material on CE solutions and RE sources available at the Garden. The application, currently in design, presents interactive multimedia resources on CE exhibits at JBB. It is linked to a series of signals located in specific locations, through which users, through *Augmented Reality* (AR) technology or via *Quick Response Codes* (*QR*), find explanations, graphics, audios, videos, photographs and other educational material particular for each station in their digital devices (smart phones or tablets). The project includes purchasing digital tablets for JBB guides and visitors. The APP, designed as freeware, will be available for download from *AppStore* and *PlayStore*.

Image 2 Sample station for the mobile APP currently in design to support JBB's educational components on CE

These two interventions add to the two already in place in the JBB. Since launching 2014, over 500 thousand attendants have visited the Garden and been able to see the CE solutions installed in JBB with CCEP support. Once *BogotanicAPP* is operational, it is expected to attract more visitors through guided tours with the tablets provided by CCEP.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
CE generation capacity, installed or rehabilitated	0.050	0.050	-	-	0.050
Employment	10	-	40	-	40
Energy savings	1,876	1,877	-	-	1,877
GHG emissions, lifetime	563	563	-	-	563
GHG emissions, program	28	28	4.72	-	32.87
Institutions	1	1	-	-	1
Investment mobilized	366,790	366,790	-	-	366,790
Person-hours of training	116	42	364.5	-	407
Pre-investment activities	4	4	-	-	4
Tools, technologies and methodologies	3	2	-	1	3

Table 9 JBB indicators

ii. CCEP – *Iluminando* partnership

Individual solar powered lamps and charging systems solve basic needs for night lighting and cell phone charging in remote and off-grid communities. This technology is sufficiently low-cost to be affordable by rural households; however, commercial distribution and market development is extremely limited. Companies and distributors of solar technology prefer to commercialize larger, higher-cost, higher-profit PV systems, accessible only to higher-income populations and institutional programs in off-grid areas. Furthermore, distribution costs of reaching isolated rural markets present a challenge. CCEP partnered with *Iluminando*, a private-sector initiative that promotes the use of solar lanterns in off-grid communities as a commercial endeavor. *Iluminando* donated the first lot of solar lanterns for

Figure 12 Locations participating in CCEP's sponsored *Iluminando* activities

participating entrepreneurs, while CCEP financed technical assistance and training components to work with craftswomen associations in La Guajira, supported by partner FCGI and local hardware stores in Palmor. Both locations offer the conditions for growing markets throughout La Guajira and *Sierra Nevada de Santa Marta*.

CCEP and *Iluminando* identified three entrepreneurs (two in La Guajira and one in Palmor) that meet the basic requirements. Training began by identifying strengths and weaknesses and developing a commercial plan which included customer service and commercial and marketing strategies to promote solar lanterns as a viable, low-cost, and effective clean energy source for their communities. The project is underway and scheduled for completion in October 2016. Data analysis and results will be presented to GOC and interested entities as recommendations for programs and policy guidelines to replicate alternative energization schemes already underway in other Latin American countries.

iii. Demonstration projects

Two universities joined CCEP in promoting CE solutions to modern-day living challenges. *Universidad de Nariño* (UDENAR) reached out to CCEP for support to promote a CE sustainable transportation system as part of its *Campus Verde* initiative. The project promotes the use of electric bicycles charged with solar energy to move on and off campus and trains university faculty and students on the uses of clean energy in transportation, among other topics. This project not only showcases the advantages of clean energy, but also promotes small investments to improve mobility, a critical element in mid-sized cities like Pasto. Similarly, *Universidad Pontificia Bolivariana* (UPB) designed a system using a solar air conditioning system which will avoid installing a conventional electric powered air conditioning system in one of its buildings in campus. The state-of the-art technology application has great replication potential, as it can be used for air conditioning systems in hotels, hospitals, and office buildings across the country. Moreover, thousands of people transit through both campus any given day, offering significant educational and outreach opportunities. Both projects will be completed by November 2016 and results will be presented in university-wide events.

Image 3 Electric bicycle parking locations, in UDENAR

Lastly, *Dínamos, colegios que se renuevan con energía* is an educational program that incorporates instructional contents and RE/EE demonstrative applications into environmental sciences curricula in 16 schools in eight Cundinamarca municipalities with CCEP support. The project, in alliance with Cundinamarca's Secretary of Education, offers an innovative hands-on approach to natural science materials, delivers theoretical and practical knowledge on topics such as RE, EE and climate change, and integrates the use of Information and Communication Technologies (ICTs) apps and kits to facilitate knowledge transfer for elementary, middle, and high school teachers and students.

The project started by training middle and high school teachers in September. This intervention ends in November and conclusions will be presented to the Secretary of Education whose office will, in turn, evaluate results and decide whether or not to incorporate the educational contents to other school curricula in the department.

These three interventions are expected to report an additional USD 145,000 in funds mobilized and will contribute more than 40,000 person-hours of training.

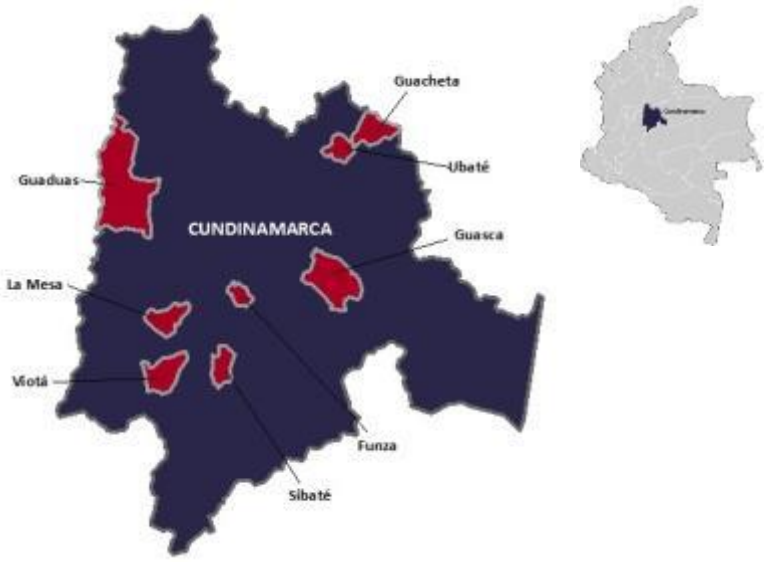

Figure 13 *Dínamos* locations in Cundinamarca

3. TASK 2: EXPANDING ACCESS TO RENEWABLE ENERGY SOURCES IN CURRENTLY UNSERVED AREAS

3.1 HIGHLIGHTS

In FY2016, CCEP T2 work focused on Work Stream 2.1: Project Identification, Implementation, and Sustainability; Work Stream 2.2: Community organization and education; **¡Error! No se encuentra el origen de la referencia.**; and Work stream 2.3: Strategy and outreach plan for cost-share funds. The first work stream is T2's main focus as it presents CCEP rural RE interventions as integrated units, with technological, environmental, and socio economic components that address key issues to reach long-term sustainability. While the availability of renewable resources dictate which energy solution is most suitable for an off-grid community, environmental and socio economic issues are also key, since RE alternatives not only depend on a constant supply of the resource, but also on the manner in which communities manage it and their organizational capacity to manage and maintain a particular energy solution with little to no outside technical assistance. Remaining work streams are, to a certain degree, immersed in the first one: long-term sustainability cannot be reached without working in community organization and education, while monitoring and evaluation and cost-share are integral parts of identifying and implementing a project and reaching full sustainability.

During the fourth year, CCEP completed all 53 RE solutions in off grid locations and was nearing completion of another 16. The Program worked in 12 departments simultaneously, with indigenous, Afro-Colombian, and *campesino* communities, overcoming great logistical and operational challenge.

Key Achievements this Year

- 38 water pumping systems (solar/mechanically assisted) installed and operating smoothly in Maicao, Uribia, and Manaure in La Guajira, in alliance with FCGI.
- Two MHPs and accompanying training and business components completed in Palmor (Ciénaga, Magdalena) and Yucal (Nuquí, Chocó).
- One hybrid (solar/diesel) energy system completed in Punta Soldado, Buenaventura, in alliance with EPSA. This is the first of its kind in Colombia, supported by the private sector.
- 12 PV systems installed in Amazonas, Antioquia, Chocó, La Guajira, Magdalena, Nariño, Valle del Cauca, Vaupes, and Vichada.
- Socio entrepreneurial and environmental training components to strengthen community-based organizations underway in 18 locations.
- 53 RE interventions completed during FY2016.
- 8,677 people were provided with improved access to energy services during FY2016.
- USD 1,854,561 invested in T2 projects during FY2016, of which USD 1,091,291 were funds mobilized from project allies and communities.

3.2 ACTIVITY SUMMARY BY WORK STREAM

3.2.1 Work Stream 2.1: Project Identification, Implementation, and Sustainability

a. Sierra Nevada de Santa Marta

i. MHP in Palmor, Ciénaga, Magdalena

Palmor, in Ciénaga, Magdalena, is a regional economic center for coffee growers in *Sierra Nevada de Santa Marta*. Twenty seven years ago, the Atlantic Coast Special Energy Program (*Programa Especial de Energía de la Costa Atlántica* - PESENCA), funded by the German government, built a MHP and assisted the community in forming a community-based rural energy service provider responsible for local power generation, distribution and commercial management, currently known as *ElectroPalmor*. Until recently, the 27-year old MHP produced a maximum of 100 kilowatts (kW), insufficient for a vibrant commercial town, currently with more than 400 households and 60 commercial establishments in the urban center and another 600 homes scattered in the rural area.

Figure 14 CCEP RE projects in *Sierra Nevada de Santa Marta*

CCEP and IPSE performed technical studies to refurbish the existing MHP and expand energy provision to an additional 150 kW by building an additional MHP. Construction began in February 2015 and was completed in June 2016.

Unforeseen deficiencies in the old unit were identified in December 2015 during trials of simultaneous operation with the new unit. In order to synchronize the old and new generator to work together depending on energy demand at any given time of day or season, ensuing repairs required a more substantial refurbishment than initially anticipated, which was completed by mid-September 2016, after a period of tests and joint operation of the two units.

CCEP also worked to strengthen *ElectroPalmor* in technical and administrative issues, to enable the company to improve service provision for a rapidly growing town. Business strengthening was focused on general administrative and accounting practices, tariff design and fee collection strategies (such as pre-

paid metering) and annual investment planning, as well as consensus building processes and accountability, expected from a community-based public service provider. The Program also provided legal assistance leading to the transformation of Electropalmor into a non-profit community owned association and public utility provider (*Asociación de Usuarios del Servicio de Energía de Palmor de la Sierra mpresa de Servicios Públicos – ELECTROPALMOR E.S.P.*)

Hanz Rippe, USAID

Photo 1 First cohort of electrical installation technicians in Palmor, Ciénaga, Magdalena

The Program also worked with IPSE to train community youths and adults in rational energy use (*uso racional de energía* – URE) using the institute's methodology and material. CCEP also sponsored the formation of 18 expert technicians in installation and maintenance of internal electrical installations, paving the way for *ElectroPalmor* and the community to modernize internal household and business installations and meters. This activity, carried out under the socio entrepreneurial assistance project, evidenced a firm commitment from the community and will turn out to be fundamental to ensure that the project outlives CCEP's presence and assistance. One of the outreach products produced by CCEP to generate community pride and appropriation of the new system was the 2016 Palmor calendar, based on MHP and real-life stories and characters. Six hundred calendars were distributed in Palmor; an additional 400 calendars to Program stakeholders and key allies.

Image 4 Palmor 2016 calendar

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	1,895	-	1,580	-	1,580
CE generation capacity, installed or rehabilitated	1.015	-	0.150	0.865	1.015
Employment	300	-	-	300	300
GHG emissions, lifetime	6,701	-	-	6,701	6,701
GHG emissions, program	168	-	168	-	168
Institutions	1	-	1	-	1
Investment mobilized	819,172	819,172	-	-	819,172
Person-hours of training	3,844	276	3,064	-	3,340
Pre-investment activities	3	3	-	-	3

Table 10 Palmor indicators

ii. PV systems for Educational Institute of Bunkwimake, Santa Marta, Magdalena

Bunkwimake has a boarding school pertaining to the *Resguardo Indígena Arhuaco de la Sierra Nevada de Santa Marta*, located in Santa Marta, Magdalena. As a regional center, Bunkwimake provides education and health services to more than one thousand Arhuaco children from four communities (Ati Gumuke, Bunkwimake, Jiwa, and Seykwanamake). The town had two power generators (gasoline and diesel) that barely produced enough energy for classrooms, school kitchen, and public lighting; the school also had a 20-year old PV system that powered computers; and the health center and an abandoned solar refrigerator.

María Camila Cortés, CCEP

Photo 2 Bunkwimake students with solar lanterns donated by CCEP

Community leaders requested CCEP support to help solve their energy needs and strengthen education and health services in the region. The original project, designed in 2013 in alliance with IPSE, included an 8 kW MHP and several productive facilities, had to be cancelled in CCEP's Third program year (PY3) due to the requirement of a costly and complex environmental license by the ANLA, due to its location within a National Park (*Sierra Nevada de Santa Marta*); ANLA licensing requirements are designed for 10 MW (10,000 kW) hydroelectric plants, not commensurate to the scale of the project (8 kW). Upon persistent requests by the educational institution and Arhuaco leadership, the Program designed, and implemented during FY2016, a project where PV systems provide solar lighting for school facilities (school restaurant/study hall and dormitories and respective bathrooms) and the donation of 220 solar lanterns to the school to help children complete their

homework and studies when out of school premises. Solar lanterns were donated in July, while PV installations began in August and were completed in September.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	220	-	207	-	207
CE generation capacity, installed or rehabilitated	0.001	-	0.001	-	0.001
CE generation capacity with financial closure	0.001	-	0.001	-	0.001
Employment	10	-	10	-	10
GHG emissions, lifetime	22	24	-	-	24
GHG emissions, program	1	-	0.47	0.48	1
Institutions	1	-	1	-	1
Investment mobilized	533	533	-	-	533
Person-hours of training	160	-	156	4	160
Pre-investment activities	3	3	-	-	3

Table 11 Bunkwimake indicators

iii. MHP in Sabana de Crespo, Valledupar, Cesar

Comunidad Indígena Arhuaca de Sabana de Crespo located in *Sierra Nevada de Santa Marta* is made up of more than seven thousand people, of which over 4,000 have received health services from the clinic run by the *Arhuaco* health provider (*instituto prestador de salud* – IPS) *Wintikua* during the last two years. Basic public services are scarce: the community does not have access to energy, aqueduct, sanitation, nor water treatment.

James Mamian, CCEP

Photo 3 Project opponents request suspension of MHP construction in Sabana de Crespo

Initially, CCEP planned to build an 18 kW MHP – and initiated construction – to provide energy for the health clinic, the school, the community meeting hall, and community stores located in the town. The idea was that the MHP would be interconnected to form a hybrid RE system with the 12 kW solar system recently installed by the Solar Electric Light Fund (SELF) under a separate USAID project in this community. Project long-term sustainability contemplated strengthening the indigenous IPS to operate,

manage and maintain the MHP, training on EE practices to the institution, the *resguardo* and community members. *Wintikua* and the indigenous cabildo would be responsible for long-term management and operation of the energy solution provided by the program.

In the course of FY2016, CCEP retired from Sabana de Crespo due to unsurmountable differences amongst indigenous authorities and laymen in favor and opposing the project. Project cancellation represented a big blow for the Program: four years of work were lost and Incentive Fund projections and program indicator targets had to be adjusted accordingly.

Furthermore, the Program had to deal with the issue of disposing of construction materials, pipes, and the turbine and generator purchased for Sabana de Crespo. Since MHPs are custom-made, based on specific characteristics of the water source (flow, fall, volume), CCEP had to search for alternative sites fitting the power needs and physical requirements of this particular MHP in several departments (Guajira, Magdalena, Cesar and Cauca). Based on a 2013 identification study carried out by CCEP at the request of IPSE and *ElectroPalmor*, the Program identified a population with similar characteristics, located close to Palmor. Given that CCEP no longer had the time needed to carry out a new MHP, the Program approached several local and regional authorities to inquire about the possibility of building a MHP in Siberia and received commitments to implement the project in 2017 from the Municipality of Ciénaga, the *Fundación ProSierra*, *ElectroPalmor* and the Local Community Action Board (*Junta de Acción Comunal* - JAC) of Siberia. As a result, CCEP contracted technical and topographical studies to design the civil works and electric components required for the construction. Studies and materials will be donated to ElectroPalmor, which along with local authorities, the NGO *ProSierra* (which has a station near Siberia) and community-based institution will lead the MHP construction post-CCEP.

b. La Guajira

i. Solar and mechanically-assisted water pumps in indigenous Wayuu communities

Water is a precious resource in La Guajira: thousands of rural dwellers receive between 100 and 500 mm of rain per year. In some locations, cistern trucks deliver water, for a price. In others, women and children must walk long distances back and forth to artisanal wells or rain-fed artificial lakes (*jagueyes*), to collect the resource for human consumption, animal herding, and meager crop cultivation.

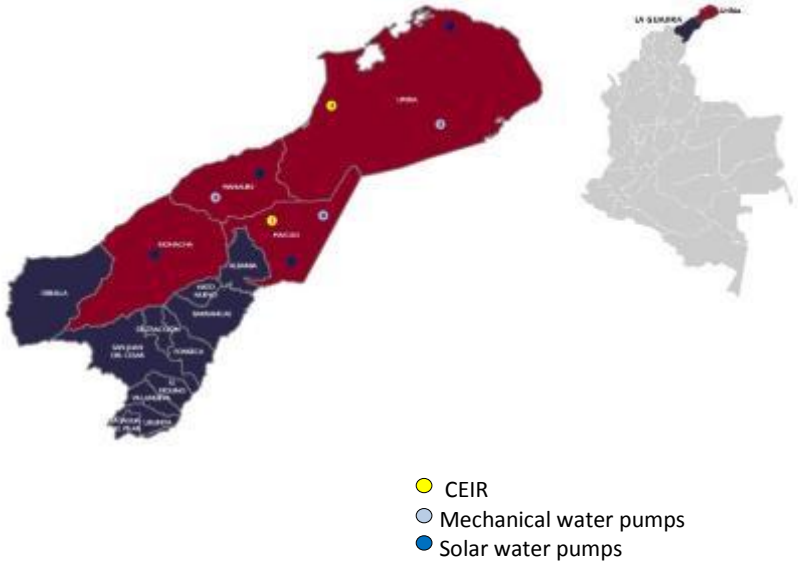

Figure 15 CCEP RE projects in La Guajira

CCEP worked with FCGI to help Wayuu indigenous communities improve access to water by installing PV and mechanically-assisted pumping systems in 38 *rancherías* in three municipalities in the department. Three communities connected their pumps to micro aqueducts, while another two to drip irrigation systems that FCGI set up for small farming areas.This project, directly benefited nearly 2,500 people and similar number of occasional beneficiaries from neighboring communities, and facilitated capacity building at the local level, training project beneficiaries and other interested communities on PV systems and mechanical pump operation, maintenance, and repair. CCEP fostered peer-to-peer exchanges by inviting a Nicaraguan expert on mechanically-assisted water pumps to visit several locations, interview users, share lessons learned and make recommendations to improve operations. The exchange was followed by a series of workshops and on-site training on pump use, maintenance and repair, offered by the manufacturer. As part of close out activities, CCEP reviewed project indicators to confirm final figures. In this case, the Program adjusted GHG emissions, lifetime, since certain interventions were mistakenly double counted during FY 2016.

Juan Daniel Correa, CCEP

Photo 4 Crops at Ishichon, drip-irrigated through water extracted by solar water pumps

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	2,399	395	2,069	-	2,464
CE generation capacity, installed or rehabilitated	0.009	-	0.018	-	0.018
Employment	496	84	654	-	738
GHG emissions, lifetime	284	314	(27)	-	287
GHG emissions, program	14	-	20	-	20
Institutions	1	-	1	-	1
Investment mobilized	216,848	174,491	42,357	-	216,848
Person-hours of training	1,872	1,656	1,028	-	2,684
Pre-investment activities	4	4	-	-	4
Tools, technologies and methodologies	1	1	1	-	2

Table 12 Water pumping project in La Guajira, indicators

CCEP and FCGI inaugurated the project in late April. The event included visits to three communities, where project participants explained the benefits of the two types of water-pumping systems and the impact in their lives and wellbeing, as access to water is a life-changing situation to desert-dwelling communities.

The Program produced two tailored products for the closing event – and also as a tool to showcase and promote this type of solution for other Wayuu communities: a series of videos (1-minute, 3-minute and 7-minute versions, in Spanish and English, available in USAID's YouTube channel) and a leaflet with project infographics, which can be downloaded from the CCEP website. CCEP also produced a grand-format photo exhibit with modular displays. FCGI and local authorities set up the exhibit in open locations throughout the department and, at the time of writing, has been exhibited in various locations in Riohacha.

CCEP witnessed notable spinoffs that resulted from this intervention. First, the project received significant media coverage, attracting attention to sustainable and low-cost solutions for water provision in remote locations by numerous national, local and international organizations working in La Guajira for potential replicability in other communities; second, it offered the opportunity to build alliances with USAID-funded World Food Program interventions in other locations in Colombia; and third, introduced CCEP to the Office of the High Commissioner for Post Conflict, which opened the door to multiple synergies and intense interaction to replicate the "CCEP model" of integral sustainable rural energization projects in 20 departments targeted for "Rapid Response" under post conflict scenarios.

ii. PV systems for five Indigenous Educational Centers (Centro Educativo Indígena Rural - CEIR)

In the course of Program implementation, FCGI contacted CCEP and proposed a new intervention in indigenous rural education centers (*Centro Educativo Indígena Rural* - CEIR) in remote locations in La Guajira. The Ministry of Education had recently awarded desk and laptop computers and tablets to several CEIRs in the department to strengthen their educational programs. The schools and administrators approached the Foundation, requesting help to pay for the diesel to power generators. FCGI, in turn, contacted CCEP, considering this initiative as a great opportunity to strengthen the alliance between the Foundation and the Program and build upon the success of the solar and mechanically-assisted pumping systems through additional CE systems.

Maigel Lerma, CCEP

Photo 5 PV panel installed in CEIR, La Guajira

The project consists of PV systems to power school computer labs and solar refrigeration systems for school restaurants and benefits more than 2,000 school students and teachers in five boarding schools in the department: *Centro Educativo Kasutalain*, *Centro Educativo Walakari* (*Media Luna*), *Centro Educativo Jurura*, and *Centro Educativo Kamusuchiwo*, in Uribia; and *Centro Educativo Kasumana* in Maicao.

Project work started in September and is scheduled for completion by October 2016, adding more than 2,000 beneficiaries to CCEP.

c. Chocó

i. MHP in Cabildo Indígena Rio Pangüí El Yucal

In Yucal, located in Nuquí, Chocó, a small diesel power plant provided sporadic energy to 95 Embera families living in the town. CCEP and IPSE identified this location as a suitable place to build an 18 kW MHP to replace the old diesel plant and support productive activities that could generate earnings to the *cabildo* and provide excess income for MHP maintenance. CCEP initiated the construction of the power plant in February 2015, which was completed and inaugurated in November 2015. The event received extensive coverage on institutional and commercial channels, including MME Minister *tweets* and a video presentation with President Santos.

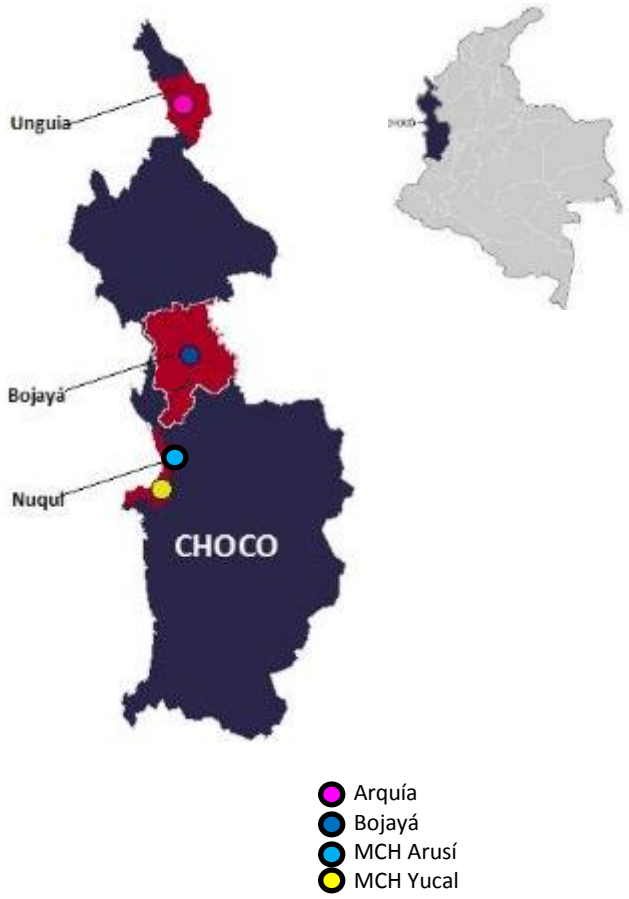

Figure 16 CCEP RE projects in Chocó

CCEP and IPSE also formed and strengthened a local community board for energy services management (*Junta Administradora de Servicios de Energía* - JASE) which is responsible for MHP management and maintenance and the productive solutions installed in the community. In addition, CCEP sponsored the business strengthening component to assure sustainability of the MHP, the village power grid and the productive installations consisting of community rice mill, corn sheller and carpentry.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	416	472	-	-	472
CE generation capacity, installed or rehabilitated	0.018	0.018	-	-	0.018
Employment	94	-	116	-	116
GHG emissions, lifetime	2,413	2,413	-	-	2,413
GHG emissions, program	121	121	30	-	151
Institutions	1	-	1	-	1
Investment mobilized	214,314	261,865	-	-	261,865
Person-hours of training	3,812	249	4,243	-	4,492
Pre-investment activities	4	4	-	-	4
Tools, technologies and methodologies	1	1	-	-	1

Table 13 Yucal indicators

Made in Yucal

Yucal was one of many Embera communities in Chocó with little to no development opportunities. Until recently, the town had no energy services and few sources of income. The town had a small diesel power plant which had broken down several years ago, and was on a prolonged waiting list for refurbishment by the municipal energy provider, *ElectroNuquí.* Up to this point, it was a traditional and paternalistic approach to energy provision in ZNI – limited to diesel plants, diesel subsidies and 4-hour service due to the small population size.

CCEP and IPSE funded an 18kW MHP to provide energy 24 hours a day to the 95 homes that make up the town. What made the intervention in Yucal different from all others was CCEP's complementary investments: from the get-go, the project was designed with a productive component in mind to ensure long-term sustainability. The Program worked with the community to form a JASE and identify profitable sources of income and incorporate three productive lines into the intervention.

A specialized Program subcontractor worked with the *cabildo* and trained leaders and community members alike on community strengthening activities. The *cabildo* leaders, in turn, chose members as JASE representatives. They received further training on business management, entrepreneurial practices, and MHP operation and maintenance. The JASE was also appointed responsible for the communal productive activities facilitated by the Program: a community rice mill, a corn sheller and a small carpentry workshop. The idea behind these productive lines was that proceeds from tariffs charged for value-added services would be divided between the *cabildo*, represented by the JASE and individual community members. The *cabildo* portion would guarantee MHP operation, maintenance, and repair in the short and long term, while the rest would represent extra source of income for the community.

CCEP's intervention in Yucal reached a critical point when the mill was installed, but there was no rice to grind. The reason was simple: *cabildo* members had abandoned their traditional plots and replaced rice with plantain, which appeared more profitable at the time. As more and more people replaced crops for plantain, the market reacted accordingly and prices dropped. The community requested CCEP support to re-establish their traditional rice crops. The Program responded, providing specialized technical assistance to help farmers improve techniques by combining traditional indigenous practices with modern-day methods. Today, the

ii. PV systems for community infrastructure in Arquía

Arquía is home to more than 600 Kuna Tule in Unguía, Chocó. This community participated in a national program with the Social Prosperity Department (*Departamento para la Prosperidad Social* – DPS) to improve and expand education, health and other social and productive infrastructure in the town: the indigenous government hall, an artisan workshop for artisan women, two new school classrooms, a school restaurant, and a development center for early childhood.

James Mamian, CCEP

Photo 6 Solar refrigerator in Arquía

In late 2013, DPS formed an alliance with Unguía Mayor's Office and *Pastoral Social* to build and/or reconstruct facilities at Arquía, assigning a budget for the architectural designs and infrastructure construction. In July 2014, DPS invited CCEP to identify RE solutions that could provide energy services to the proposed infrastructure, consisting of three existing buildings and four more to be built. The Program recommended PV systems for the seven buildings that would provide community services. Due to lengthy procurement procedures, until the end of August 2015, DPS had been unable to provide an estimated start and end date for construction work, delaying CCEP intervention. The Program was informed that construction would begin by the end of August and be completed in mid-December, 2015. CCEP monitored construction progress to program its own intervention, consisting of installing PV systems in up to seven buildings once the buildings were ready.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	630	-	-	630	630
CE generation capacity, installed or rehabilitated	0.004	-	-	0.004	0.004
CE generation capacity with financial closure	0.004	-	0.004	-	0.004
GHG emissions, lifetime	54	-	-	54	54
GHG emissions, program	1	-	-	1	1
Institutions	1	-	-	1	1
Investment mobilized	322,465	-	361,953	-	361,953
Person-hours of training	300	-	-	300	300

Table 14 Arquía indicators

CCEP installations began in August and were nearing completion in September, pending correction of only minor installation glitches by October. Given that in an independent project, implemented after T2 formulation, the Ministry of Information and Communications Technology (*Ministerio de Tecnologías de la*

Información y las Comunicaciones - MinTIC) provided computers, internet connection and solar energy for one of the buildings considered in CCEP's design, the total number of buildings subject to CCEP intervention was reduced to six.

iii. MHP for Arusí, Partadó and Termales

During 2015, CCEP invested great efforts and constant monitoring towards the construction of a 100 kW MHP in Arusí and conduction lines to provide energy services for Arusí, Partadó, and Termales, in Nuquí, Chocó. The project, whose GOC components were fully funded and contracted by August 2014, on the part of CCEP also included all the design work and permits, the implementation of the forest clearing and management component, as well as the construction of an ice production facility for fishing cold chain, training on EE, and infrastructure work to update household electric installations. All components after the forestry management plan implementation were dependent on the completion of the civil works, generation equipment and power grid commissioned by GOC. CCEP allies included *Presidencia*, DPS, and IPSE.

The six-month project, initially estimated at USD 1.3 million (USD 950,000 in counterpart leverage; USD 350,000 in USAID/CCEP funding) faced delays from the start due to the lack of know-how and commitment by the GOC construction and auditing contractors and lax supervision on the part of *Presidencia*, DPS and the Financial Fund for Development Projects (*Fondo Financiero de Proyectos de Desarrollo* - FONADE), the development fund in charge of managing the project for GOC. Ten months later, the project budget was almost twice as much as initially estimated and only the 10.5 km power line had been installed, with no advance at all in the hydro energy civil works or the electromechanical equipment. In late August 2015, CCEP informed allies that (a) it had completed its Forestry Management Plan component; (b) the results of an independent engineering audit demonstrated zero construction progress since the June 2015 meeting at the US Embassy and the impossibility of completion by end of year; and (c) the Program would only participate further if a second technical inspection performed in December 2015 confirmed that all construction work was completed and that the MHP is operating. CCEP intervention in Arusí was contingent upon constant energy supply: an ice factory cannot operate with any electricity, household installations and pre-paid meters would be moot, as would the socio entrepreneurial strengthening of a local energy service company for non-existing energy provision.

CCEP kept USAID informed on project developments (and lack of progress) and provided constant technical assistance to participating GOC entities throughout the first quarter of FY2016. CCEP's continued participation in this project was clearly informed to USAID, GOC and community to be contingent on project completion or substantial progress, both of the MHP (DPS/*Presidencia*) and the power lines (IPSE), as certified by an independent engineering assessment.

By December 2015, agreements had been reached between *Presidencia*, DPS, IPSE, FONADE, constructors and auditors to resume work in January 2016 using the original design by CCEP, and complete the project by May or June 2016. For Program purposes, however, USAID and CCEP had established March 2016 as the final cut off and pull out date. The December schedule ratified the impossibility of CCEP to embark on further investment by March, the transfer of responsibility for environmental permits and *consulta previa* from CCEP to GOC and/or the Riscales Council was formalized prior to pull out. At the time of writing, the project remained suspended and in legal arguments.

d. Buenaventura, Valle del Cauca

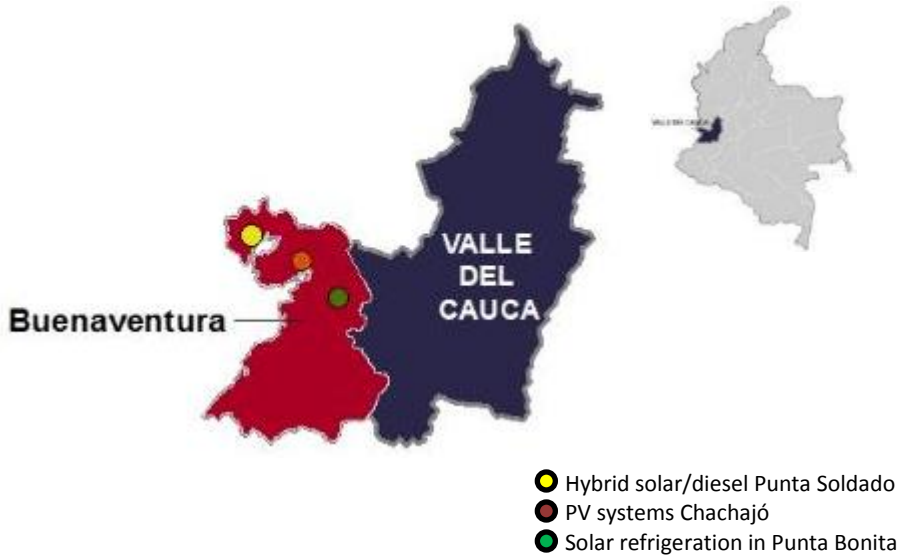

Figure 17 CCEP RE projects in Buenaventura

i. Solar refrigeration project in Punta Bonita

Afro-Colombian communities located along the Colombian Pacific Coast traditionally live off fishing, river-based gold mining, and timber exploitation. Environmental concerns led community leaders of *Consejo Comunitario del Rio Cajambre* to take on fishing as their main activity, protect forest areas from commercial timber use and water sources from heavy metals frequently used in gold mining activities. Traditionally, fishing provides subsistence for families and communities; excess fish is sold in neighboring towns but, in general, community members do not see its every-day productive activity in terms of income generation. In 2014, the municipal government donated a 75 kW diesel plant, insufficient to provide a sustainable source of energy to support the cold chain in this fishing community.

Juan Daniel Correa, CCEP

Photo 7 PV systems installed at PINPESCA facilities, for solar-powered refrigerators

The *consejo* and its fishing co-op, PINPESCA (*Asociación de Pescadores y Piangüeras del Río Cajambre*), had previously participated in several USAID programs and received technical assistance and training on sustainable fishing practices and commercial and business aspects. CCEP developed this project to help resolve the community's and the association's energy needs by installing PV systems and solar-powered refrigerators guaranteeing the fish cold chain and, thus, improve commercial and income generation opportunities to PINPESCA. The project also included training on operation, maintenance, and repair to PV systems and solar refrigerators, as well as on financial administration and tariff structure (charge per kilogram of fish refrigerated) to assure system sustainability over time.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	313	313	-	-	313
CE generation capacity, installed or rehabilitated	0.008	0.008	-	-	0.008
Employment	313	313	-	-	313
GHG emissions, lifetime	108	108	-	-	108
GHG emissions, program	5	5.39	1.34	-	7
Institutions	1	1	-	-	1
Person-hours of training	240	600	80	-	680
Pre-investment activities	3	3	-	-	3

Table 15 Punta Bonita indicators

ii. Hybrid solar/diesel power system in Punta Soldado

Like many other population centers located along the Colombian Pacific Coast, Punta Soldado lacked continuous energy services. Productive activities were limited to fishing with restricted commercial opportunities since the lack of energy or cold storage facilities forced the community to sell its produce in Buenaventura. Community development and education were also restricted to daylight.

EPSA, one of the country's largest electricity companies, approached CCEP in 2013 to work together identifying, structuring, and implementing RE solutions for communities in its area of influence, specifically Punta Soldado. Progress in the formulation and roll out of RE options were slow due to lack of experience and hesitance by the company to finance this type of "costly" installation (compared

Hanz Rippe, USAID

Photo 8 Carlos Alfonso Valencia, in Punta Soldado, examines the solar panels installed by CCEP and EPSA

to more familiar and profitable urban installations). During the course of site visits, community discussions and project design, however, RE/EE Law 1715 was passed in 2014 and stimulated national interest in the installation of hybrid energy systems in ZNI, motivating EPSA and corporate owner CELSIA to develop and install a hybrid solar/diesel system for Punta Soldado (a community of 114 households and several institutional and commercial establishments) as a pilot project – despite surpassing conventional cost limits per residential installation which had made the company hesitate to co-finance the project. CCEP and EPSA agreed to carry out complementary work: this project included the installation of pre-paid meters, funded by EPSA, to help reduce long-standing debt and encourage greater EE and rational use of energy, and enable EPSA and CELSIA to remotely monitor each client's consumption patterns as called for by recent regulations for the ZNI derived from Law 1715/2014. For CCEP, the opportunity to involve a major player in the electricity market in this type of project was also strategic, not only to assure technical backing for the operation of the hybrid and solar systems in the future, but as part of its RE institutionalization efforts.

CCEP and EPSA had complementary responsibilities in project implementation: construction of civil works, household electric installations, installation of PV systems and public lighting, replacement of traditional lightbulbs for LED and installation of pre-paid meters. The diesel-power generator to complement PV power was paid for by EPSA, due to CCEP funding restrictions. The project also included training on good environmental practices and a strong socio economic component to consolidate the existing JASE, provide EE training, and hybrid PV/diesel system operation and maintenance. Work began in October 2015 and was completed in July 2016. The private hybrid power project, first of its kind in the country, was inaugurated in July. CCEP produced a video with community testimonies telling their experience (available in USAID's YouTube channel) and a series of photographs showcasing the impact of the project in community life. As part of close out activities, CCEP reviewed project indicators to confirm final figures. In this case, the Program adjusted GHG emissions, lifetime, since certain interventions were mistakenly double counted during FY 2016.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	650	-	363	-	363
CE generation capacity, installed or rehabilitated	0.075	-	0.075	-	0.075
Employment	35	-	35	-	35
Energy savings	652	-	652	-	652
GHG emissions, lifetime	1,033	1,275	(242)	-	1,033
GHG emissions, program	64	-	29.72	-	29.72
Institutions	1	-	1	-	1
Investment mobilized	227,087	227,087	42,594	-	269,681
Person-hours of training	1,820	-	1,577	-	1,577
Pre-investment activities	3	3	-	-	3
Tools, technologies and methodologies	1	-	1	-	1

Table 16 Punta Soldado indicators

iii. PV systems for Chachajo

In 2015, CCEP designed RE projects for five communities with CVC for 50/50 co-funding and implementation during 2016. Consensus building, contracting procedures, and preoperational activities were finalized by CCEP in order to begin project implementation in the five communities by July and finalize by December 2015, given that CVC's counterpart funding was approved by its Board of Directors (BoD) for that calendar year. However, CVC was forced to halt all its contracting procedures with indigenous and Afro-Colombian community associations due to an investigation opened by the National Controller's Office (*Contraloría General de la Nación*) to follow up on bidding and contracting processes amongst regional environmental authorities. CVC representatives were not formally accused of transgressions but the institution's contractual processes were signaled out as potential pitfalls and continuing its traditional procurement procedure for projects committed with CCEP posed a risk to the corporation. After assessing the situation internally, CCEP met with CVC and decided to continue on its own with only one of the projects, designed for the installation of PV systems in Chachajo, located in Buenaventura, Valle del Cauca, the largest and most sustainable of the five communities, home to more than 400 people.

Isabel Ramírez, CCEP

Photo 9 PV panel installed in Chachajo

PV system installations began in August and are scheduled to end by October 2016. The project included public lighting, solar-powered refrigeration systems for the school and PV systems for family houses and the community center.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	498	-	-	498	498
CE generation capacity, installed or rehabilitated	0.013	-	-	0.013	0.013
CE generation capacity with financial closure	0.013	-	0.013	-	0.013
Employment	10	-	-	10	10
GHG emissions, lifetime	184	184	-	-	184
GHG emissions, program	5	-	-	5	5
Institutions	1	-	-	1	1
Investment mobilized	-	80,056	(80,056)	-	-
Laws, policies, strategies, plans or regulations	-	-	-	-	-
Person-hours of training	1,400	-	-	1,400	1,400

Table 17 Chachajó indicators

CCEP carried out an assessment to design the socio economic and the business strengthening component. The resulting plan, underway and scheduled for completion by November 2016, takes into account a long-term sustainability strategy for the RE solutions, training community members on PV operation and maintenance and forming a JASE to manage and operate the system.

e. Cancillería: Telemedicina, Siapana, and Serranía del Perijá

i. PV systems in ten *Telemedicina* Frontier Health Centers

Telemedicina is a GOC program in which communities located in border municipalities have remote access to timely, high quality, and efficient health services via telecommunications. The telemedicine program counts with regional hospitals to attend remitted patients and specialists who attend the patients by means of this technology from "reference centers" in Bogotá, Barranquilla, Medellín and other capital cities. However, this is possible only if energy service is constant and sufficient to provide power for medical and telecommunications equipment in remote and isolated places.

CCEP worked with the Colombian Ministry of Foreign Affairs (*Ministerio de Asuntos Exteriores - Cancillería*) to take this program to ten locations around the country, installing solar refrigerators and PV systems. Project interventions were completed in September.

Figure 18 CCEP RE projects with *Cancillería*

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	3,098	-	-	3,098	3,098
CE generation capacity, installed or rehabilitated	0.011	-	0.011	-	0.011
CE generation capacity with financial closure	0.011	-	0.011	-	0.011
Employment	20	-	-	20	20
GHG emissions, lifetime	190	226	184	-	410
GHG emissions, program	5	-	3	-	3
Institutions	10	-	-	10	10
Investment mobilized	138,624	138,624	-	-	138,624
Person-hours of training	320	-	44	94	138

Table 18 *Telemedicina* indicators

ii. PV Systems for the Educational Institute of *Siapana*

Once *Telemedicina* had been agreed to, CCEP worked with *Cancillería* to identify and formulate two additional RE projects for North Guajira and the *Serranía del Perijá* in Cesar and La Guajira, for which *Cancillería* had already appropriated counterpart funding and assigned a project implementer for the duration of 2015, extensible to 2016. Several components were fully designed by end of 2015, such as PV systems to provide energy to a boarding school in Siapana, Uribia, La Guajira, and some partially (e.g., solar systems for coffee growing farms in Cesar), needing only final adjustments, so CCEP embarked in two new interventions with *Cancillería*.

José Eddy Torres, CCEP

Photo 10 Siapana students do homework at night with splendid solar-powered lighting installed in the boarding school, one of several RE solutions

The Educational Institute of Siapana is a Wayuu boarding school located in La Guajira that provides education to more than 850 residing children from Siapana and other communities as far south as Uribia, and 600 external students. The school had two diesel power generators (40 and 60 kW) that produced energy for classrooms, school kitchen, and other needs on a daily basis for a period of only four to six hours.

CCEP intervention in Siapana was designed to provide energy on a continuous basis through solar PV systems for currently unattended services: solar refrigeration for perishable foods, solar power for 20 laptop computers and audiovisual aids, and solar lighting for auditorium and student study area. CCEP began work in August and completed installations in September.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	890	-	-	890	890
CE generation capacity, installed or rehabilitated	0.009	-	-	0.009	0.009
CE generation capacity with financial closure	0.009	-	0.009	-	0.009
Employment	40	-	-	40	40
GHG emissions, lifetime	216	-	-	216	216
GHG emissions, program	5	-	-	5	5
Institutions	1	-	-	1	1
Investment mobilized	84,946	-	85,438	-	85,438
Person-hours of training	7,200	-	-	7,200	7,200

Table 19 Siapana indicators

iii. Solar systems for *cafeteros* in *Serranía del Perijá*

The Guajira and Cesar Coffee Growers' Committee (*Comité de Cafeteros de Guajira y Cesar*) works with *Cancillería* to enhance productive infrastructures of small coffee farms in *Serranía del Perijá*. Improvements include solar dryers, coffee processing machines and other repairs to housing and crops. So far, the *Comité* has implemented 70 solutions and began a new stage to implement 350 additional ones. The project for Perijá involved the installation of 35 small PV systems to provide energy to drive DC motors to power small individual coffee processing machines and provide basic household electricity for lighting , TV and cell phone charging. Project beneficiaries were selected among the farmers with coffee bean processing machines and permanent homes on the farms so the solar systems would be used throughout the year, not only during 80 days of harvesting.

Juan Daniel Correa, CCEP

Photo 11 PV panels in Perijá provide energy to coffee bean dryers and processing machines

The installations began in August and completed in September, but since coffee harvesting had not begun the solar-powered motors installed can only be tested with full loads by end of October, a CCEP requirement for final acceptance of the installations.

Cancillería, in turn, is responsible for the socio economic strengthening, providing additional training on EE practices and PV system operation, repair, and maintenance and forming a JASE among the 35 beneficiaries, responsible for PV system operation, maintenance, and repair. The JASE thus formed will receive all installations in donation and, in turn, sign an 8-year loan and restitution contract with each individual farmer, assuring monthly service payments and annual quotas to assure sufficient funds for periodic maintenance and opportune replacement of batteries and LEDS lights installed.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	140	-	-	140	140
CE generation capacity, installed or rehabilitated	0.010	-	-	0.010	0.010
CE generation capacity with financial closure	0.010	-	0.010	-	0.010
Employment	35	-	-	35	35
GHG emissions, lifetime	180	-	-	180	180
GHG emissions, program	5	-	-	5	5
Investment mobilized	108,541	-	108,541	0	108,541
Person-hours of training	720	-	-	720	720

Table 20 Perijá indicators

f. RE projects in Antioquia: PV systems for street lighting and water pumping in Vigía del Fuerte, Antioquia and Bojayá, Chocó and CERI in Necoclí, Antioquia

Communities in Vigía del Fuerte, Antioquia and Bojayá, Chocó lived first-hand the atrocities of illegal armed actors for too long. Now people look forward to a positive and optimistic future, powered by regional development, where energy is key. CCEP, the Antioquia Governorship and *Empresas Públicas de Medellín* (EPM) worked to provide solar energy for the water treatment plant, the pumping system for the aqueduct and to install public lighting in both Vigía del Fuerte and Bojayá. The agreement also covered installing solar electric power to a Rural Indigenous Educational Center (*Centro Educativo Rural Indígena* – CERI) in Necoclí, whose buildings had not been completed in time to include in the joint CERI project covering an initial 14 schools in FY2015.

Figure 19 CCEP RE project in Vigía del Fuerte and Bojayá

Due to their mandates as regional government and public utility company of Antioquia, the CCEP allies channeled their funds to the water treatment plant and aqueduct in Vigía del Fuerte and the CERI; while CCEP covered the public lighting components and socioeconomic strengthening in all locations. Installations began in August and were completed in September.

CCEP also worked with Vigía and Bojayá energy service providers to design a strategy to ensure future funding for PV system operation, maintenance and future replacement and battery disposition.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Beneficiaries	2,725	-	4,473	-	4,473
CE generation capacity, installed or rehabilitated	0.081	-	0.036	0.045	0.081
CE generation capacity with financial closure	0.081	-	0.081	-	0.081
Employment	15	-	23	-	23
GHG emissions, lifetime	1,176	-	373	804	1,176
GHG emissions, program	59	-	12	46	59
Institutions	3	-	5	-	5
Investment mobilized	397,581	-	397,581	-	397,581
Person-hours of training	360	-	1,414	-	1,414
Pre-investment activities	6	2	-	-	2

Table 21 Vigía and Bojayá indicators

Up through 2015, solar installations required for individual CCEP projects were independently procured. Given the amount of solar systems involved in projects formulated for 2016, CCEP bid an IQC for the supply and installation of home and social infrastructure solar systems, solar street lighting and solar refrigeration throughout the country, and another for the technical auditing or inspection of the installations. After receiving 39 expressions of interest and five formal proposals for the solar installations foreseen to be installed within six months, CCEP selected the winning proponent. CCEP also selected – and negotiated the fees of – the proponent who should undertake technical inspections and audit the correct specifications, installation and performance of the solar systems commended to the company hired, which is why in each project an "inspection report" is expected shortly after each installation is delivered. However, things did not go as planned: component imports and transportation took longer than assured by the subcontractor due to shipping, customs and trucker strike delays, forcing the Program to postpone installation activities and reprogram implementation schedules, Incentive Fund projections, and indicator reporting. Eventually, installations began in July and were completed in September. However, due to the remote location of many of these installations, or the need to make final adjustments or holding tests such as in the case of Perijá coffee farms, some of these projects will be closed in October.

3.2.2 Work Stream 2.2: Community organization and education

Each T2 project intervention includes community organization, outreach, and education activities as core components to promote ownership and reach long-term sustainability. Strong communities serve as solid foundations which guarantee that CCEP interventions reach their full potential over the years. Program work in this component is varied: it includes working with formal rural energy service providers, such as

ElectroPalmor, to strengthen operations, administration, service provision; forming and training JASEs on RE installation operation and maintenance as well as financial management; and educating communities on natural resources and EE, as a way to preserve RE sources. This last element provides CCEP with the opportunity to work with a broader scope.

The Program worked with the Organization for Environmental Education and Protection (*Organización para la Educación y Protección Ambiental* - OPEPA) to identify and train environmental leaders in Punta Bonita, Chachajo, and Punta Soldado and form ecoclubs with children ages 7 thru 18 to complement community training on adequate management of natural resources and good environmental practices. Through a participative learning methodology known as TINI (*Tierra de Niños y Jovenes*), CCEP and OPEPA supported the formation of ecoclubs in three schools in these Buenaventura locations. In addition to environmental training, EE practices, and conservation of RE sources, children and their families have access to small land plots to improve food security and are encouraged to protect biodiversity, carry out conservation awareness campaigns, protect their environment and promote a

OpEPA

Photo 12 Punta Bonita ecoclub members participate in environmental conservation training session

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Employment	45	-	-	45	45
Institutions	18	-	3	15	18
Person-hours of training	6,780	-	4,607	2,173	6,780
Tools, technologies and methodologies	1	-	1	-	1

Table 22 Indicators for community organization and education, corresponding to Ecoclubs and JASE business strengthening training

respectful attitude towards nature. OPEPA is the perfect ally for this work as the organization is a leader in environmental education in Colombia and has formed and strengthened more than 80 ecoclubs throughout the country.

CCEP realized that community organization and education efforts had to benefit more than T2 project participants. Thus, the Program designed a project to train formal and informal energy service providers and JASEs from rural Buenaventura on administration, finance and energy provision service and maintenance. This initiative, in alliance with the Buenaventura Mayor's Office, will also provide local providers a standard tool kit for maintenance and repair of existing power generators in their towns. The training program is scheduled for October.

3.2.3 Work stream 2.3: Strategy and outreach plan for cost-share funds

CCEP did not plan to embark in new projects during 2016 and, consequently, did not plan strategies or outreach activities to encourage cost-share funds in T2 projects. However, project delays led the Program to report funds mobilized for activities implemented during this year.

During FY2016, the Program reported over USD 1 million in funds leveraged and/or mobilized from GOC, private sector and beneficiaries, and USD 850,000 in Incentive Fund investments in T2 projects. The highest contribution, over USD 390,000 was from Antioquia Governorship/EPM, for the CCEP intervention in Vigía del Fuerte and Bojayá. Figure 20 shows public and private funding for CCEP T2 interventions that started in FY2016.

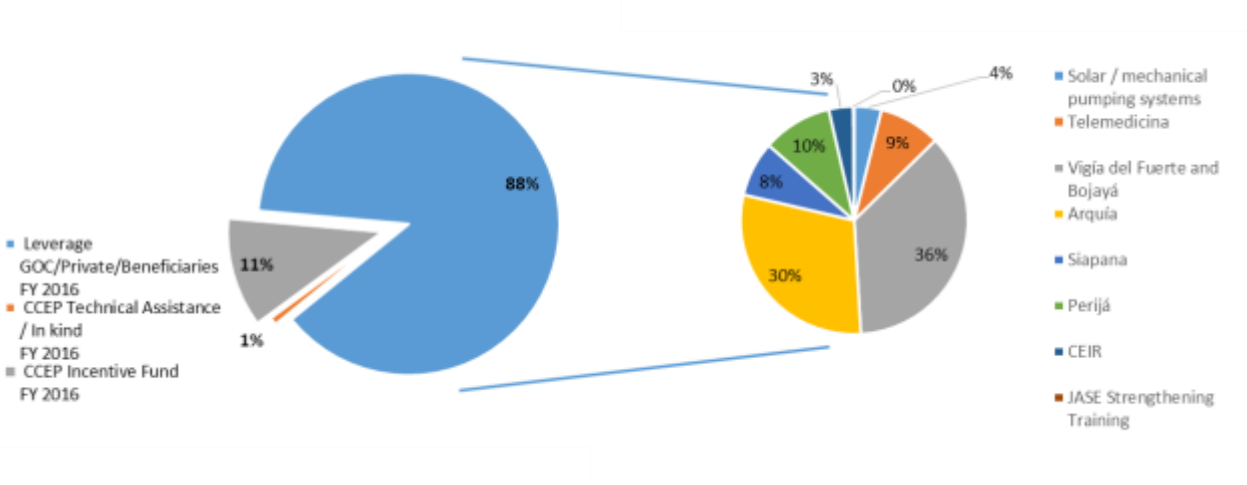

Figure 20 Public and private sector funds leveraged for T2 interventions during FY2016

3.3 CCEP T2 LEGACY

CCEP's approach and success in developing and implementing sustainable rural community RE projects has drawn increasing attention from national and international agencies who could potentially replicate these types of interventions throughout the country.

Program staff worked with existing partners and new actors, like the World Food Program (WFP), Colombia Presidential Agency for International Cooperation (*Agencia Presidencia para Cooperación Internacional de Colombia* - APC) and the Post Conflict *Rapid Response* team, to identify potential projects for future implementation. One key example of potential spin-offs has been our La Guajira water pumping project with FCGI, to which the FCGI and WFP added the drip irrigation, farming and food security component. Inaugurated in May 2016 with USAID Director Peter Natiello, on July 8 a site visit promoted by USAID with numerous GOC institutions yielded commitments by the Colombian Family Wellfare Institute (*Instituto Colombiano de Bienestar Familiar* - ICBF) to undertake a few solar water pumping projects in the department and WFP to request support from the multi-donor fund attached to Post Conflict. After a meeting between USAID, WFP, Post Conflict and CCEP on July 21, within 24 hours CCEP and FCGI provided the technical input and budget design for typical interventions to WFP for its proposal to Post Conflict.

Since then, CCEP and Post Conflict have worked closely together to identify potential "integral" rural energization projects for the latter to promote, cofinance and implement in different regions: Pacific

Coast, Cauca, Cesar, Orinoquia, Amazonia. Post Conflict has also been working with other partner enery sector institutions (UPME, MME) in preparing initial drafts of a National Rural Electrification Plan called for in the Peace Accord, though energy sector and Post Conflict staff seek to transform it into a *de facto* National Rural Energization Plan*,* since in both the energy sector institutions and in the Post Conflict team the interest is in replicating CCEP field experience and policy legacy in strategic regions and rural productive chains.

4. TASK 3: ENERGY EFFICIENCY AND RENEWABLE ENERGY INVESTMENT PROMOTION

4.1 HIGHLIGHTS

CCEP review of Program activities in T3 during the formulation of AWP4 resulted in the merger of all interventions into three main lines: Work stream 3.1: Assist in the installation of coal dosifier systems in SME brick manufacturers; Work stream 3.2: Promote adoption of combustion optimization technologies in boilers and kilns; and Work stream 3.3: Consolidate opportunities for private sector investment in clean energy through CCEP's PPF, which reflect Program evolution during the last three years.

All T3 work streams and interventions are focused on EE and RE promotion with the private sector. CCEP worked with the Environmental Business Corporation (*Corporación Ambiental Empresarial* - CAEM) on the installation of coal dosifier systems in SME brick manufacturers in Cundinamarca and Boyacá; with various scales of enterprises to optimize the operation of boilers and kilns by installing combustion optimization technologies that result in improved production processes; and with industrial partners to conduct technical and financial feasibility studies that show potential benefits of EE and RE investments implemented in production processes.

In FY2016, CCEP supported the installation of coal dosifier systems in 18 SME brick manufacturers in Cundinamarca and Boyacá; improved 12 combustion systems in an equal number of companies companies in five departments; and co-financed six detailed engineering studies in agroindustry, food and beverages, forestry, pulp and paper, and sugar cane production and processing to determine whether or not planned investments are technically feasible and financially viable, or in the case of detailed engineering studies, to finalize layouts, adjust basic designs to current conditions and make other adjustments to investments already commissioned.

Key Achievements

- 18 brick manufacturers in Cundinamarca and Boyacá completed combustion optimization projects, reducing 10,288 tons of CO_2 emissions during FY2016. Overall, the Program supported 19 companies, which will result in a minimum reduction of 102,888 tons of CO_2 emissions per project lifetime.
- Cleaner energy solutions installed in another 12 brick, metallurgical and textile factories in Antioquia, Atlántico, Caldas and Cordoba, reducing an additional 11,078 tons of CO_2 emissions during FY2016.
- 16 PPF studies completed or underway totaling a potential investment of up to USD 134 million and a reduction of more than 2 million tons of CO_2 emissions per project lifetime. Two additional PPF studies were approved for cofinancing by UPME and initiated by counterpart companies, but due to lengthy administrative procedures at UPME were not formally contracted by September 2016 and thus not reported yet.
- Implementation of the first two phases of one of the PPF projects resulted in an addition reduction of 7,792 tons of CO_2 e during FY2016.
- A grand total of 44,108 tons of CO_2 e and 611,023 MWH in energy savings were accomplished by T3 during FY2016.
- USD 9,992,687 invested in T3 projects during FY2016, of which USD 9,585,042 were funds mobilized from project allies.

4.2 ACTIVITY SUMMARY BY WORK STREAM

4.2.1 Work stream 3.1: Assist in the installation of coal dosifier systems in SME brick manufacturers

Different studies prove that low-cost technological solutions can significantly reduce fossil fuel consumption and CO_2 emissions per unit of output in brick kilns and industrial boilers. Following this logic, CCEP partnered with CAEM in 2014 to implement pulverized coal dosifiers in 20 small and medium enterprises (SMEs) brick manufacturers in Cundinamarca and Boyacá. CAEM did not perform as expected nor delivered as many brick manufacturers and actual dosification systems as originally scheduled.

Figure 21 Location of SME brick manufacturers in Cundinamarca and Boyacá that improved combustion systems

The project initially focused on SME brick manufacturers interested in improving coal-fired kilns through the introduction of coal dosifiers which pulverize and inject coal particles for complete combustion, but lacked technical and financial capacity to invest in engineering studies or access formal bank loans. The USD 1.7 million project aimed to reduce fuel consumption by 30% and 154,300 tons of CO_2e emissions over 10-year project lifetime in 20 companies. Given the lack of progress during the first 12 months of implementation, CCEP and CAEM analyzed various scenarios in September 2015 to improve and accelerate this technology's adoption and focused implementation on working with SME brick manufacturers that either had the financial muscle to cover the 50% investment in equipment stipulated or that were eligible for financial credit, seeking to recover time elapsed and reaching project targets.

Juan Carlos González, CCEP

Photo 13 CCEP team of engineers inspects equipment installed in *Ladrillera El Sol*

This situation required a direct intervention from T3 staff, who increased efforts in overseeing project implementation to assure compliance by equipment providers. During all FY2016, CCEP engineers, management and administrative staff closely monitored project progress, but nearing project closing dates it was evident that CAEM could not deliver the installation of effective improved combustion systems in 20 SMEs. At that stage, CAEM required more time, equipment manufacturers needed to modify or finalize installation improvements, and brick

manufacturers needed to adapt to the technological change installed. This led to a four-week suspension and no-cost extension of the standard grant agreement issued in order to complete at least 19 effective solutions, of which five were only completed in August. Project activities closed on September 28, 2016, though final reporting was pending for October.

The implementation of coal dosifiers evolved at different a pace in the beneficiary companies: while some have successfully performed tests in their kilns achieving expected results in CO_2e emissions reductions, others have been unable to meet the implementation and calibration schedules due to persistent technical or operational problems. Consequently, CO_2e emissions reductions reported to date reached 10,288, while project lifetime emissions were anticipated to reach 102,888 – subject to verification and adjustment once final reports are submitted and CCEP supervisors and consultants assess performance.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Employment	120	15	93	38	146
GHG emissions, lifetime	154,273	29,280	73,608	59,773	162,661
GHG emissions, program	15,805	2,928	7,361	3,599	13,888
Institutions	19	1	17	1	19
Investment mobilized	599,837	635,122	-	-	635,122
Person-hours of training	1,060	837	1,064	-	1,901
Pre-investment activities	5	5	-	-	5
Tools, technologies and methodologies	1	1	2	-	3

Table 23 SME brick manufacturers in Cundinamarca and Boyacá, indicators

4.2.2 Work stream 3.2: Promote adoption of combustion optimization technologies in boilers and kilns

CCEP participation in "Industrial Use Energy Combustion Optimization Systems" projects, which for simplicity's sake we refer to as "Boiler and Kiln" projects, seeks to promote and co-sponsor initiatives that implement EE technologies for industrial combustion equipment, such as boilers, kilns, driers and other apparatus that use thermal energy. CCEP's boiler/kiln projects demonstrate how the adoption of low-cost, high-savings combustion improvement technologies require little engineering work, take advantage of financial structuring through cost-share schemes and show emissions reduction and energy savings results in the short term.

Contrary to CCEP work with CAEM, the Program's boilers/kilns project reported outstanding progress throughout the year: twelve boiler/kiln optimization combustion systems were installed and in operation by September 2016, with 416,835 MWH in energy savings and 11,078 tons of CO_2e emissions reduced.

In addition to interventions completed during FY2016, CCEP also monitored progress of past activities. FY2016 progress and cumulative indicators for T3 projects is presented in the following table.

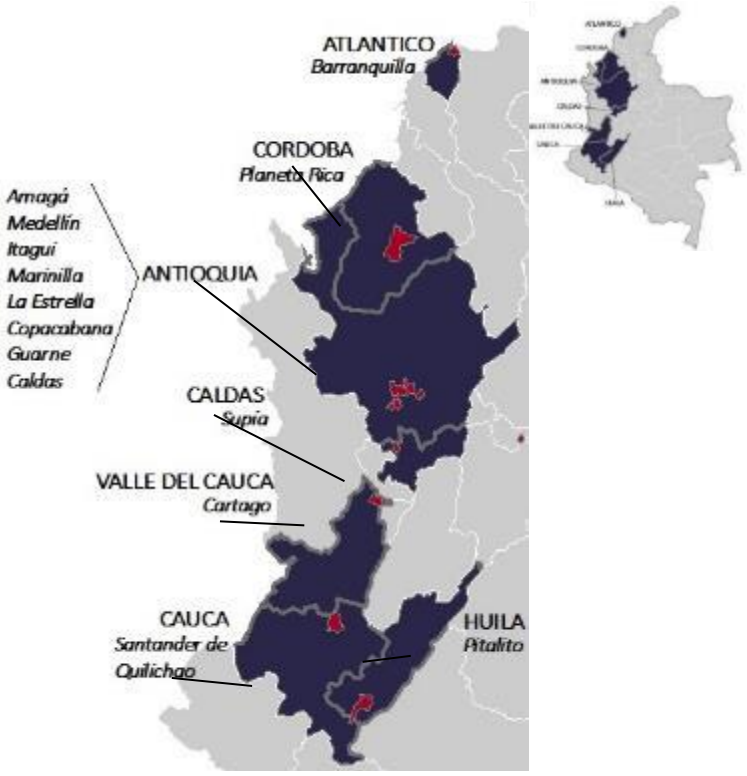

Figure 22 Location of SMEs participating in CCEP boiler/kiln activities

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Energy savings	288,790	-	416,836	401,344	818,179
GHG emissions, lifetime	266,350	-	137,861	133,370	271,230
GHG emissions, program	11,747	-	11,079	10,591	21,670
Institutions	16	-	10	6	16
Investment mobilized	1,171,818	210,014	86,482	879,320	1,175,816

Table 24 Boiler/kiln indicators

4.2.3 Work stream 3.3: Consolidate opportunities for private sector investment in clean energy through CCEP's PPF

The PPF mechanism offers companies the opportunity to co-finance and develop final engineering and business plans required by corporate BoDs and financial institutions to make decisions regarding investments in clean energy production processes, either through RE technology or EE practices. As a financial mechanism geared to stimulate investment in CE, the PPF was conceived as part of CCEP's policy work and "*enabling environment*" T1. However, given the specialized nature of projects being structured, CCEP mobilized its engineering capacity through T3 to closely supervise and indeed participate in step-by-step designs.

During FY2016, CCEP co-funded six detailed engineering studies and followed up on the status of studies completed during FY2015. As of September 2016, two projects resulting from 2015 PPF-ESCO[1] studies have been implemented; two have started contractual or commissioning processes for implementation due for completion during first semester of 2017; one has been approved for implementation by 2019, three from the current pipeline are highly attractive and will probably be implemented post-CCEP, and four have been discarded due to low return on investments. Four more studies have been completed and projects structured are either awaiting BoD decisions or have been postponed due to economic factors (exchange rates, etc.).

CCEP investment in PPF studies totals approximately USD 320,000, with the potential of mobilizing funds of up to USD 134 million if all studies and recommendations are implemented. The 16 projects have the potential of reducing more than 2 million tons of CO_2e during project lifetime.

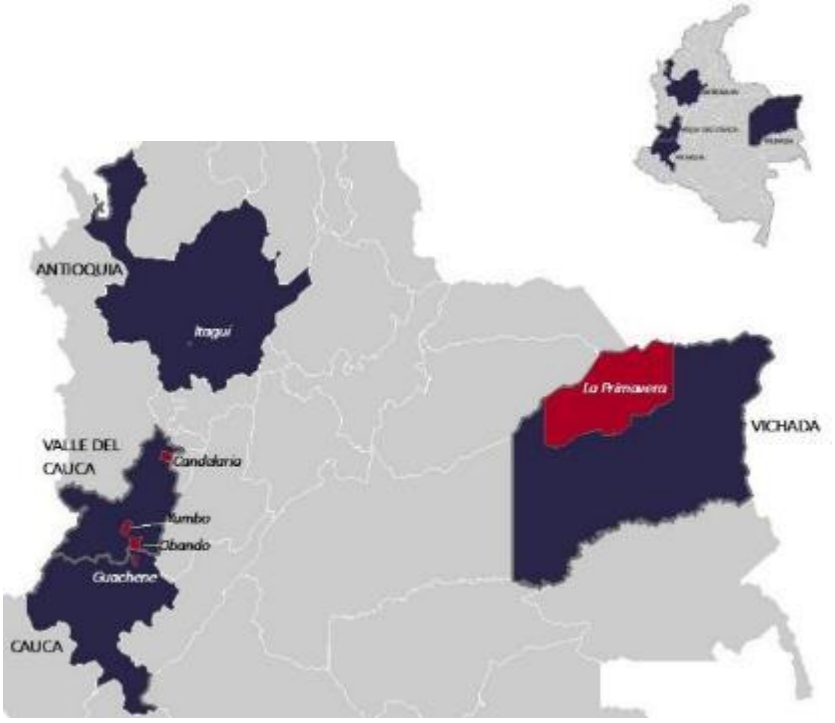

Figure 23 PPF project locations

[1] Due to its similarity with the PPF mechanism, the Colanta biogas-to-steam structured under CCEP's FY2015 ESCO workstream has been assimilated to PPF investment in this section, since the PPF encompasses CCEP's previous work with ESCOs.

Implementation status	Number of Projects	Sum of CCEP Investment (in USD)	Sum of Funds mobilized (in USD)	Sum of Estimated emissions reduced per year (tons of CO2e)	Sum of Estimated emissions reduced during project lifetime (tons of CO2e)
Implemented	2	$54,011	$2,870,000	20,000	416,920
In process	2	$153,200	$5,000,000	12,200	614,000
Future implementation	1		$35,000,000		
Potential	3	$80,749	$21,495,667	52,600	1,052,000
Pending	3	$31,625	$65,060,737	27,504	
Discarded	5		$5,304,725	8,358	
Total	**16**	**$319,585**	**$134,731,128**	**120,662**	**2,082,920**

Table 25 PPF project status

The CCEP co-funded studies are the result of a Request for Proposals (RFP) published in national media early FY2016. The Program invited companies to present proposals to carry out engineering studies to implement EE and RE solutions in industrial sectors. CCEP initially received 52 proposals, of which 18 were pre-selected for further consideration (site visits; technical and financial evaluation) based on three main criteria: energy savings, potential reduction of CO_2e emissions and financial indicators (debt/asset ratios, etc.). After a thorough evaluation of these projects, a second call for bids was held in early 2016 among industrial and engineering firms which had already participated in the 2015 phase of the PPF.

UPME and CCEP's PPF committee finally selected six projects for implementation through the Incentive Fund and two projects for implementation with UPME funding during the remainder of FY2016.

INDICATORS	PROJECT TARGET	CUMMULATIVE FY 2015	FY 2016	GOAL Q1/2017	EXPECTED PROJECT TOTAL
Energy savings				57,363	57,363
GHG emissions, lifetime	132,040	-	405,040	-	405,040
GHG emissions, program	4,975	-	7,792	4,845	12,637
Institutions	1	-	1	-	1
Investment mobilized		697,867	1,071	1,502,935	2,201,874
Pre-investment activities	15	-	15	1	16

Table 26 PPF indicators

Carvajal, hace las cosas bien

CCEP and Carvajal, a major pulp and paper company that produces paper products out of sugar cane bagasse in plants in Yumbo (Valle del Cauca) and Guachené (Cauca), developed a strong relationship based on a shared commitment to reduce CO_2e.

In 2014, the company was in search of options to reduce CO_2e emissions and comply with environmental requirements set by CVC for companies located in the Yumbo industrial corridor. It participated in CCEP-sponsored activities and accepted to co-finance two engineering studies with the technical and financial rigor proposed by the PPF, to move beyond very basic identification of alternatives and design well structured investment projects to save fossil fuels and reduce emissions.

At present, the company has completed the implementation of the boiler reconversion project designed under one of the 2015 engineering studies, which not only improved operations in the Yumbo plant. It also saves daily operational costs both from purchase of coal for its 10-story steam "boiler #5" and the disposal of daily mounds of biomass residues. The paper and pulp production process produces between 600 to 700 tons of ground "bagasse dust" per day, of which Carvajal only used up to 250, leaving significant leftover byproduct. An engineering firm hired between CCEP and Carvajal analyzed the situation and suggested a four-phase solution. Two phases totaling over USD 750,000, involving modification of air circulation and the installation of a "dust collector", have been implemented, while two additional phases worth USD 1.4 million are pending. At the time of writing, Carvajal has increased the intake of excess biomass residue in the intervened boiler by 100 tons per day, reducing coal consumption by 4.5% (7,000 tons per year), which represents over 20,000 tons of CO_2e reduced/year. A second study, also produced in 2015, analyzed options to cogenerate steam and electricity using residual biomass and coal in the Guachené plant. Three scales of cogeneration plants were analyzed, all viable. After further investment bank analysis, the largest scale USD 35 million investment option (24 MW) was approved by the BoD and will be operating by 2019.

Positive results led the company to work with CCEP to co-fund two more engineering studies during FY2016. Carvajal uses black liquor, a pulp byproduct, as fuel for a 330 ton/day heat recovery boiler. The boiler capacity fell short and excess liquor was wasted or taken to other plants for processing. One study, submitted in August 2016, identified operational improvements and modifications estimated in USD 1.5 million to increase boiler capacity by 20%, reducing waste, generating steam and up to 3 MW of electricity in a condensation-based turbine. A second one, dated September 2016, was the detailed engineering study for a USD 2.6 million investment already commissioned to increase the plant's black liquor evaporative capacity by 23%, from 6,700 to 9,000 tons/year, thus improving efficiency and optimizing production cost per unit produced.

Results are promising and Carvajal has to date approved investments of over USD 40 million, mobilized based on a USD 196,000 investment from CCEP. The four EE/RE projects will help reduce 1 million tons of CO_2e over project lifetime.

Just with this one company, the time and effort invested in PPF as a whole has certainly paid off!

Besides technical and administrative manuals, extensive project documentation and numerous meetings by the joint UPME-CCEP PPF committee, CCEP also designed and produced several products to position PPF, focusing on its future institutionalization and the work done with allies. The Program produced a series of bookmarks with basic information about the PPF and a link to its online site: www.ccep.co/mecanismo. The link also presents information about the PPF and downloadable formats to submit proposals requesting support.

Lastly, *Colombia Genera*, a two-day event on February 2016, organized by ANDI with support from the British Embassy, provided the scenario to present PPF as an UPME-led effort to promote EE in Colombia.

5. COMMUNICATIONS AND OUTREACH ACTIVITIES

5.1 HIGHLIGHTS

In FY2016, CCEP significantly enhanced Program and project visibility with target audiences, carrying out C&O activities to promote the use of CE in Colombia; raise awareness about USAID and partner initiatives in the country; generating visibility on the impacts of CE in underserved and vulnerable communities; and creating consciousness on the impacts of CE in the private sector and promoting EE applications.

Key Achievements this year

- Redesigned Program website.
- High-impact newsletter with 1,720 subscribers in over five countries.
- High profile and quality press coverage of CCEP projects in national, regional and local media

5.2 TOOLS AND PRODUCTS

The tools and products presented in the following sections are the Program's main means to implement its C&O Strategy.

5.2.1 Website

The C&O team completely redesigned the Program website, as presented in Image 5. The site is CCEP's main institutional channel through which the Program communicates with target audiences and provides information in a clean and clear manner. CCEP website is www.ccep.co.

The Program website contains basic information on each task; key achievements updated on a quarterly basis; downloadable communications and outreach materials; links to national and local press coverage; properly branded products that result of program's work; and links to the program video and photo galleries. The site is versatile and allows the creation of interactive tools that present and disseminate Program initiatives.

Image 5 Screenshot of CCEP's redesigned website, launched in early 2016

5.2.2 Branding and Marking Plans

CCEP prepared Branding and Marking (B&M) plans for projects, as required by USAID guidelines.

In March 2016, USAID presented an updated Graphics Standard Manual and Partners' Co-Branding Guide. The C&O staff reviewed the documents and attachments and participated in a teleconference to discuss the updated guide and answer partner questions.

5.2.3 USAID-Branded Communication Products

Technical staff and C&O team members met to review FY2016 initiatives and define activities and products to support Program and project implementation during the year, while fostering a sense of ownership and setting the foundations for long-term sustainability. The calendar produced for Palmor is one example.

5.2.4 "Communication with Energy" and "Clean Energy for Colombia" Newsletters

In order to enhance Program visibility among team members and close allies, CCEP distributed 50 issues of its "Communication with Energy" (*Comunicación Energética*) internal newsletter during the fiscal year. This electronic internal newsletter showcases information on CE facts, news and developments, not necessarily associated to the Program. The bulletin also serves as a trial instrument to analyze CCEP's outreach possibilities and potential.

Image 6 CCEP's Energía Limpia para Colombia

The first issue of CCEP's "Clean Energy for Colombia" (*Energía Limpia para Colombia*) external electronic newsletter was published on October 14, 2015. This bulleting was designed to promote and inspire the use of CE in the country and raise awareness of CCEP activities in each task. Since then, external newsletters have been published on a monthly basis.

Readership results obtained through analytics means are interesting and provide a solid base to consider products and content for online material during the program year. As of September 2016, the *Energía Limpia para Colombia* e-newsletter reports 25.4% "open" clicks - well above industry average (18.5%); number of subscribers increased from 604 to 1,720 this fiscal year, resulting in 3,732 effective verified impacts. The monthly newsletter also served knowledge management purposes, publicizing information on CE in the country. Newsletters serve to promote news from Program allies, with particular focus on giving a voice to communities that benefit from T2 projects. The idea is to use these tools to promote CE as a subject that is above USG or GOC interests. A map of products analytics in shown in the next page.

Figure 24 Analytics for CCEP's *Comunicación Energética* and *Energía Limpia para Colombia* e-newsletters, as of September 2016

5.2.5 Media Coverage

CCEP received significant press coverage throughout the year, presented in ANNEX: CCEP IN THE MEDIA, page 73. This media coverage has being quite positive and has helped CCEP to broaden understanding of the concept of clean energy and its associated benefits, particularly to under-served and vulnerable communities, as an integral part and essential element for the country's development. This media coverage has also contributed to promote the use of clean energy in Colombia and has help to create awareness and understanding of some initiatives undertaken by USAID and its main partners to promote clean energy in Colombia.

5.2.6 Photography and Video

CCEP CE solutions, both in RE and EE, are highly innovative and the Program uses highly innovative and creative ways to show project impacts, particularly in the production of digital online communication material.

This year, CCEP produced a series of videos and photographs, available in the redesigned website: Palmor is Energy; Guajira Power; Clean Energy for "El Yucal"; Energy with very high degrees of temperature; and Energy with very low degrees of temperature.

Image 7 Photo galleries available in CCEP's website

Starting top left: Palmor is Energy (Juan Daniel Correa, CCEP); Guajira Power (Hanz Rippe, USAID); Clean Energy for "El Yucal" (Juan Daniel Corea, CCEP; Energy with very high degrees of temperature (Grito Producciones, for CCEP); Energy with very low degrees of temperature (Grito Producciones, for CCEP)

CCEP also used state-of-the art technology in selected photographs to include Augmented Reality (AR) contents for mobile devices (smart phones, tablets, and cell phones with camera and APP download systems). All photos include AR technology and audiovisual content can be accessed by opening Clean Energy Augmented Reality in a mobile device. Through the device the observer has access (via photographs, posters, billboards, and computer screens) to virtual environments (videos) that allow an amplified perception of reality in real-time.

The Program also developed and produced two large-format photo exhibits. *Ka´I otta Wuin* (Sun and Water, in Wayuunaiki) is described in "Solar and mechanically-assisted water pumps in indigenous Wayuu communities ". The second exhibit, "Colombia is Energy", composed of 14 photographs with AR videos, was first exhibited in *Teatro Jorge Eliecer Gaitán* (July 29 to August 29th) and, since September 6, in *Universidad Distrital*'s *Aduanilla de Paiba*.

Lastly, CCEP filmed and produced several high-definition videos based on Program interventions:

- CE solutions and EE experiences in two companies that participated in T3 projects in Antioquia and Caldas. The video is titled "Energy at Very High and Low Degrees.
- Video documentary of the solar and mechanically-assisted water pumps in La Guajira, a project implemented in alliance with FCGI, and launched during project inauguration. The video documentation was filmed during more than one year and showcases the conditions before, during, and after project implementation of the solar and mechanically assisted water pumps in 38 sites in La Guajira. https://youtu.be/ROa9PlJ-Cuo

- Short video documenting CCEP's intervention in Sabana de Crespo, motivated by differences amongst community members which ultimately led to project cancellation.
- Video documentary of the hybrid solar/diesel power project in Punta Soldado, in alliance with EPSA. The video documentation was filmed upon project completion and presents testimonies of how living conditions and education opportunities improved once the project was completed. https://youtu.be/-O3zXNQJ8ag

5.2.7 Events and Productions

During FY2016, CCEP produced various events to inaugurate Program projects. Information about events is included in the corresponding sections, above. Events and productions that are not directly related to CCEP projects are presented below.

a. The Green Race

With USAID support, CCEP participated in an exhibit during the second edition of the Bogota Green Race in February 2016. The event, organized by *Fundación Natura* with the support of the United States Embassy, gathered more than five thousand professional and amateur athletes. CCEP prepared and organized a CE demonstration site for the Environmental Fair, previous to the race, and the day of the race. The sites included an exhibition stand powered by solar energy and "energized" refreshments, made by appliances using solar power.

Juan Daniel Correa, CCEP

Photo 14 Father explains his daughter how solar energy produces electricity

b. Bicycle Power

CCEP participated in and sponsored a series of exhibits and stations at Primavera Fest, in Medellin, in May 2016. CCEP designed two interactive stations. Pedaling with the DJ (*Pedaleando con el DJ*) required participants to use a stationary bicycle to produce sufficient energy to power lights and DJ equipment playing music. The bike also charged cellphones and was the only charger available at the fair, as no electric plugs were available for the public. Medellín by Bike (*Medellín en bici*) was a miniature city display with an electric cycling trail connected to four bicycles that participants used to "race" around town.

6. PERFORMANCE INDICATOR RESULTS AGAINST TARGETS

In this Chapter we present CCEP's Indicators as detailed in the Performance Management Plan (PMP) and reported in MONITOR, actual progress through September 2016. When applicable, it also includes remarks explaining why some indicators are behind.

Table 27 CCEP Indicators, as of September 2016

INDICATOR	PROGRAM TARGET	CUMMULATIVE FY 2015	FY 2016	FY/2017 GOAL	EXPECTED TOTAL
Beneficiaries	16,000	2,098	8,677	7,807	18,582
CE generation capacity that achieved financial closure	0.240	-	0.150	0.0052	0.205
CE generation capacity, installed or rehabilitated	0.500	0.095	0.291	0.220	0.610
Employment	2,000	698	1,052	1,027	2,777
Energy savings	1,500,000	273,786	611,675	764,046	1,649,507
GHG emissions, lifetime	495,001	128,368	678,465	228,675	1,035,508
GHG emissions, program	80,000	11,217	44,461	22,882	78,560
Institutions	47	29	53	64	146
Investment mobilized	5,000,000	9,528,903	1,288,456	1,468,874	12,286,233
Laws, policies, strategies, plans or regulations	10	5	7	(2)[2]	10
Person-hours of training	40,000	16,198	22,818	59,154	98,170
Pre-investment activities	60	66	19	1	86
Tools, technologies and methodologies	10	15	17	8	39

[2] At the time of writing and as part of close out activities, CCEP is reviewing project indicators to confirm final figures. In this case, the Program will adjust the number of laws, policies, strategies, plans or regulations reported since certain interventions were mistakenly double counted during FY 2016.

ANNEX: CCEP IN THE MEDIA AND SOCIAL NETWORKS

CCEP's collaborative effort with USAID and the GOC has received coverage through various local and international publications as described below:

National Media:

- RCN NOTICIAS broadcast and web page, October 12, 2015: note on CCEP-assisted solutions in Punta Bonita, Clean Energy for Buenaventura
- PORTAFOLIO web page, October 28, 2015: "Esta fábrica de helados bajó de 60% su gasto de energía", http://www.portafolio.co/negocios/empresas/fabrica-helados-60-gasto-energia-3522
- PORTAFOLIO front page, November 23, 2015: "Reconversión, una ladrillera cambió el carbón por la cáscara de café", http://www.portafolio.co/negocios/ladrilleras-cambian-carbon-cafe
- PORTAFOLIO, December 21, 2015: "La fórmula de c1 jeans para sacar prendas más verdes", http://www.portafolio.co/negocios/prendas-verdes-formula-ci-jeans
- SEMANA SOSTENIBLE web page, March 5, 2016: "Día internacional de la eficiencia energética", http://sostenibilidad.semana.com/medio-ambiente/articulo/dia-mundial-de-la-eficiencia-energetica-por-que-es-importante-este-concepto/3470
- CARACOL NOTICIAS, May 24, 2016: La Guajira water pumping project presented in *Gente que le pone el alma*
- MINUTO 30.COM, June 30, 2015: "Con la ayuda de energías renovables se calma la sed de casi 500 familias wayúu", http://www.minuto30.com/fotos-con-la-ayuda-de-energias-renovables-se-calma-la-sed-de-casi-500-familias-wayuu/491970/
- CONTACTO LATINO, July 1st, 2016: "A pedalazos, comunidades wayús reactivaron pozos de agua", https://contacto-latino.com/es/noticias/201502/205067429/a-pedalazos-comunidades-wayus-reactivaron-pozos-de-agua-eltiempo-com/
- COSTA NOTICIAS web page, July 1st, 2016: "Con energía solar y a pedalazos los Wayúu reactivaron pozos de agua", http://costanoticias.com/con-energia-solar-y-a-pedalazos-los-wayuu-reactivaron-pozos-de-agua/
- EL TIEMPO, July 1st, 2016: "A pedalazos, comunidades wayús reactivaron pozos de agua", http://www.eltiempo.com/colombia/otras-ciudades/comunidades-wayuu-tienen-agua-con-tecnologia-que-funciona-con-energia-solar/16634301
- HABLEMOS DE MINERÍA, July 2, 2016: "A pedalazos, comunidades wayús reactivaron pozos de agua", http://hablemosdemineria.com/2016/07/01/pedalazos-comunidades-wayus-reactivaron-pozos-agua/?platform=hootsuite
- EL HERALDO, July 2, 2016: "Con energía solar y pedaleando los wayuu reactivaron pozos de agua", http://www.elheraldo.co/la-guajira/con-energia-solar-y-pedaleando-los-wayuu-reactivaron-pozos-de-agua-269608
- PERIODICO LA GUAJIRA, July 2, 2016: "Con energía solar y a pedalazos los Wayúu reactivaron pozos de agua", http://www.periodicolaguajira.com/index.php/general/160-informe-especial/36636-con-energia-solar-y-a-pedalazos-los-wayuu-reactivaron-pozos-de-agua
- ENTORNO INTELIGENTE webpage, July 2, 2016: "Con energía solar y pedaleando los wayuu reactivaron pozos de agua", http://www.entornointeligente.com/articulo/8643702/Alberto-Ardila--Con-energia-solar-y-pedaleando-los-wayuu-reactivaron-pozos-de-agua-02072016
- ECONOTICIAS, July 4, 2016: "Con energía solar y a pedalazos los Wayúu reactivaron pozos de agua" http://www.ecoticias.com/eco-america/125335/con-energia-solar-y-a-pedalazos-los-wayuu-reactivaron-pozos-de-agua

- EL COLOMBIANO, July 5, 2016: "Energía solar para reactivar pozos de agua", http://www.elcolombiano.com/negocios/energia-solar-para-reactivar-pozos-de-agua-KF4513972
- EL PERIÓDICO DE LA ENERGÍA web page, July 27, 2016: “Dinamos, la iniciativa colombiana para llevar la energía limpia a las escuelas”, http://elperiodicodelaenergia.com/dinamos-la-iniciativa-colombiana-para-llevar-la-energia-limpia-a-las-escuelas/
- RADIO SANTAFE web page August 1, 2016: “Niños e instituiones de Cundinamarca aprenderán prácticas de eficiencia energética”, http://www.radiosantafe.com/2016/08/01/370457/
- EL PALPITAR.COM web page , August 18, 2016: “Incentivos económicos para compañías que reduzcan sus emisiones de contaminantes”, http://www.elpalpitar.com/medio-ambiente/2016/08/incentivos-economicos-para-empresas-que-disminuyan-sus-emisiones-contaminantes/
- ECOTICIAS AMERICA web page, August 24, 2016: “Empresarios antioqueños le apostaron a las energías limpias”, http://www.ecoticias.com/eco-america/126044/Empresarios-Antioquenos-apostaron-energias-limpias
- MINUTO 30.COM web page, August 25, 2016: “Gobierno entrega beneficios a empresas que invierten en energías renovables”, http://www.minuto30.com/gobierno-entrega-beneficios-a-empresas-que-inviertan-en-energias-renovables/516165/
- COSTA NOTICIAS web page, August 26, 2016: “Plan de Energízacion Rural Sostenible para la Guajira presenta resultados”, http://costanoticias.com/plan-de-energizacion-rural-sostenible-para-la-guajira-presenta-resultados/
- EL COLOMBIANO, September 1, 2016: “Alianza USAID y empresas por un mejor ambiente”, http://m.elcolombiano.com/alianza-usaid-y-empresas-por-un-mejor-ambiente-LD4894379